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ABSTRACT

Using an inquiry-learning method rather than the lecture-demonstration teaching method, this elementary science curriculum deals with the processes of science and utilizes an inquiry approach into the causes of natural phenomena. The program was developed by an elementary science committee and recognizes the need for textbooks that will provide ample reference material to help students understand the basic science concepts developed through learning activities. There is one section for each grade level, K-8. Each section begins with a list of the basic books and materials utilized and the succeeding pages follow the same basic format: Unit Number; Concept; Behavioral Objectives; and Suggested Teaching Aids and Activities; or Supplementary Material. (Author/RH)

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# CURRICULUM GUIDE for SCIENCE

## KINDERGARTEN - GRADE 8

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*St. Louis Public Schools*
*St. Louis, Missouri*
*1972*

# INTRODUCTION

Through the past decade elementary science education has taken on a "new" direction. Two factors which have given direction to the elementary science curriculum are (1) studies of intellectual development in the young child and (2) a shift from the lecture-demonstration teaching method to an inquiry-learning method. Thus elementary science curricula now deal with the processes of science and utilize an inquiry approach into the causes of natural phenomena.

The science program developed by the Elementary Science Committee, as outlined in this guide, includes involvement in these new types of science curricula. It also recognizes the need for textbooks that will provide ample reference material to help students understand the basic science concepts developed through the learning activities.

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# KINDERGARTEN

Materials: Marshall and others, *SENSE AND TELL, Teacher's Edition and Kit*

Marshall and others, *LIVING THINGS, Teacher's Edition and Kit*

Pounds and others, *HEALTH AND SAFETY HIGHLIGHTS: PICTURES AND SONGS FOR YOUNG CHILDREN Teacher's Resource Booklet for record: "Let's Sing with Ella Jenkins"*

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
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| | *SENSE AND TELL -- UNIT 1* | | |
| I | FAMILIAR THINGS | The child should be able to: | Teacher's Guidebook, *Sense and Tell* See overview of Lessons 1-10. |
| | A. Objects can be identified by their names. | Name an object when shown the object. | |
| | B. Objects can be identified by their observable characteristics. | State the characteristics of an object he is shown in terms of its color, size, use, and weight. | FS 2123Q1 *Colors We See in the City* |
| | 1. Color<br>2. Size<br>3. Use<br>4. Weight | | |
| | C. Objects can be identified by their tactual characteristics. | Identify by name an object touched but not seen. | |
| | 1. Hard<br>2. Soft<br>3. Fuzzy<br>4. Scratchy<br>5. Bumpy<br>6. Slick<br>7. Furry<br>8. Spongy<br>9. Sharp<br>10. Smooth<br>11. Sticky<br>12. Warmth<br>13. Cold | Describe the characteristics of an object upon seeing and touching it.<br><br>State the characteristics of an object upon touching, but not seeing it.<br><br>Identify by name an object, given a description of how it feels and what it looks like. | |

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| | D. There are differences between the properties that can be determined from examining an actual object and those revealed in a photograph.<br><br>E. Objects may be identified by corresponding actual-size pictures. | State the visual and tactual differences between the photograph and the object, given an object and an actual-size photograph of that object.<br><br>Select from a collection of color photographs the one that shows an object previously shown to him.<br><br>Select from a collection of photographs the one that shows the object he feels, but cannot see. | |
| II | TEXTURES<br><br>A. Objects may be classified into two descriptive groups: rough and smooth; hard and soft. | The child should be able to:<br><br>Tell whether a touched but unseen material is rough or smooth.<br><br>Tell whether a touched but unseen material is hard or soft.<br><br>Select from several materials a touched but unseen material, given a duplicate of the material he can both see and touch.<br><br>Select a touched but unseen material given a duplicate of the material he can touch but not see. | Teacher's Guidebook, *Sense and Tell*<br>See overview of Lessons 11-21. |

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| | B. Granular substances range in textures from powders in which the grains are all but invisible to clearly distinguishable granules such as sand. | Tell whether a touched but unseen granular material is hard or soft, rough or smooth. | |
| | C. Some materials may have common properties even though they are different in other ways. | Identify a similar characteristic of two materials on the basis of seeing and feeling the materials. | |
| | D. Materials may be classified according to common attributes. | Separate touched but unseen materials into two groups: rough and smooth (rough, not rough).<br><br>Separate materials touched but unseen into two groups: hard and soft (hard and not hard). | |
| | E. Verbal descriptions of how a material feels may be reinforced by the actual touching of the materials. | Select from a collection of materials, a material he can touch but not see, when its tactual characteristics are described verbally. | |
| III | SHAPES | The child should be able to: | Teacher's Guidebook, *Sense and Tell* See overview of Lessons 22-38. |
| | A. Objects may br grouped according to color. | Identify by name the nine basic colors: red, blue, yellow, purple, green, orange, white, brown.<br><br>Group objects of a like color. | |

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| | B. The shape of the surface of an object determines its ability to roll. | Sort three-dimensional shapes according to their ability to ROLL or NOT ROLL, when released on an inclined surface. | FS 2123Q *Shapes We See in the City* |
| | C. Objects may be grouped according to shape. | Sort geometric figures into groups on the basis of shape. | |
| | D. The shape of an object may be distinguished by feeling it. | Select three dimensional geometric shapes he can touch, but not see, given an example of the same shape he can see. | |
| | E. Objects may be identified by their textures. | Select a texture he can touch but not see, given a sample of the same texture he can touch but not see. | |
| | F. Objects with a particular characteristic may be grouped together. | Sort objects according to their having or not having a given color. (Example: red, not red.) | |
| | | Sort geometric figures according to whether or not they are a given geometric shape. | |
| | G. Verbal descriptions may be used to describe two-dimensional figures. | Select a two dimensional shape when given a description of its color and shape. (Example: It's red and has three sides.) | |
| | H. One shape may be enclosed within another shape. | Identify a two dimensional geometric shape enclosed within another shape, when given an example of the shape. | |

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| | I. Shapes in two dimensions may be combined to make familiar objects. | Use two dimensional geometric shapes to make a picture. | |
| | J. Objects that have been felt may be related to photographs. | Select a three-dimensional geometric shape he can touch, but not see, when shown an actual size photograph of the shape. | |
| IV | SIZES AND WEIGHTS | The child should be able to: | Teacher's Guidebook, *Sense and Tell* See overview of Lessons 39-47. |
| | A. Objects differ in sizes. | Indicate the larger or smaller of two visible objects. | |
| | B. Objects differ in height. | Indicate which object is taller or shorter from top to bottom of two visible three-dimensional objects. | |
| | C. Objects differ in width. | Indicate which of two visible objects is wider or narrower. | |
| | | Indicate which of SEVERAL visible objects is the longest or shortest. | |
| | | Indicate two of several visible objects that are the same from top to bottom. | |
| | | Indicate which of several objects is the widest or narrowest. | |

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| | | Indicate from several objects the two that are the same width.<br><br>Arrange three-dimensional figures according to (1) how tall they are and (2) how wide they are in increasing or decreasing order. | |
| | D. Objects differ in weight. | Indicate the heavier or lighter of a pair of objects that he has lifted. | |
| | *LIVING THINGS -- UNIT 2* | | |
| I | CHARACTERISTICS OF LIVING THINGS | The child should be able to: | Teacher's Guidebook, *Living Things*<br>See overview of Lessons 1-11. |
| | A. Animals may be described in terms of their shape, texture, color, or absence of color. | Identify differences in the texture of the outer covering of the mealworm and the chameleon, using the descriptive terms *smooth, rough, smoother, rougher.* | |
| | | Identify the differences in color of the mealworm and the chameleon using the descriptive terms *red, blue, yellow, green, orange, purple, brown, black, white.* | F 1301G *Wild Animal Families* |
| | | Identify the absence of a specific color in describing the differences between the chameleon and the mealworm. | |

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| | | Identify the differences in shape and length of the chameleon and the mealworm using the descriptives *rounded, longer than, shorter than.* | |
| | B. Animals move in various ways. | Describe the movements an animal makes in various situations: at rest; being turned upside down; responding to sounds, food, and water. | F 1299E *How Do They Move?* |
| | C. Plants may be described in terms of their shape, texture, color, or absence of color. | Identify the presence or absence of colors in plants using the descriptives *red, yellow, blue, green, purple, orange, brown, black, white.*<br><br>Compare the number of leaves on two plants by using the descriptives *more than, fewer than,* or *less than.*<br><br>Identify the general shape of a plant and the shape of its leaves using the descriptive *points, rounded.* | |
| | D. Sounds may be loud or soft. | Indicate which of two sounds made by the same source is louder or softer.<br><br>Demonstrate how to make a louder or softer sound by clapping hands, whistling, etc. | |

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| | | Name the sources of common indoor and outdoor sounds from the recordings provided in the kit. | |
| | E. Sounds vary in pitch. | Identify the higher or lower pitch of two sounds. | |
| II | PICTURE INTERPRETATION | The child should be able to: | Teacher's Guidebook, *Living Things* See overview of Lessons 12-18. |
| | A. All characteristics of animals and plants cannot be discerned from color photographs of the same plants and animals. | Describe the differences observed between a (1) living plant and a color photograph of the same kind of plant; (2) an animal and a color photograph of the same kind of animal. | |
| | B. Some objects are taller than others. | Identify from life-size pictures of living things the tallest or shortest, and the widest or thinnest. | |
| | C. Some objects are wider or narrower than others. | Place in order of increasing or decreasing height life-size pictures of objects. | |
| | D. The size of an animal or any of its various parts cannot necessarily be determined from a picture. | Use a live mealworm as a model to compare with an enlarged picture of the mealworm to demonstrate that an animal can be represented larger than life in a picture. | |

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| | | Demonstrate that a picture may represent an animal smaller than actual size by using a life-size picture of a larger animal and a 3" x 5" picture of the same animal. | |
| III | MEASURING | The child should be able to: | Teacher's Guidebook, *Living Things* See overview of Lessons 19-23. |
| | A. The length of animals may be measured by using consistent units. | Use the small chameleon cards as consistent measuring units to determine the height of an animal shown in a life-size picture.<br><br>Describe his results. Example: The cat is a little longer than 1 chameleon picture.<br><br>Use the small chameleon cards as consistent measuring units to determine the width of an animal shown in a life-size picture.<br><br>Describe his results. | |
| | B. Objects may be measured by using multiple consistent units. | Use multiple consistent units to measure the height and width of an object. | |
| | C. People may be measured using multiple consistent units. | Use multiple consistent units to measure the height and width of a classmate. | |

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| IV | CLASSIFYING | The child should be able to: | Teacher's Guidebook, *Living Things* See overview of Lessons 24-28. |
| | A. Living things may be classified according to color. | Sort into two groups a set of color photographs of living things using color as the basis for sorting (red -- not red; black -- not black). | |
| | B. Animals may be classified by their appendages. | Sort into two groups a set of photographs of animals having similar types of appendages (legs -- no legs; wings -- no wings). | FS 2265A *Animals and People* |
| | C. Young and adult animals may be classified together. | Match the photographs of a young animal with the adult animal of the same kind. | FS 2250S *Birds Grow*<br>F 1300D *Farm Babies and Their Mothers* |
| V | SAFETY | The child should be able to: | |
| | A. Cross only at crossings or crosswalks. | Discuss where one should always cross the street. | Song: *"Crossing the Street" from LET'S SING WITH ELLA JENKINS, Band 3* |
| | B. Always cross the street at corners and never between two parked cars. | Dramatize what one should do before crossing a street where there are no helpers. | Song: *"I Stop, I Look, I Listen" from LET'S SING WITH ELLA JENKINS, Band 2* |
| | C. Look in all directions before crossing a street. | Explain what the different-colored lights on a traffic signal mean. | R 4803C *Songs of Safety* |

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| | D. Crossing Helpers aid in keeping us safe.<br>1. Patrol boys<br>2. Policemen<br>3. Traffic signs or signals | Crayon in the proper colors on a drawing of a traffic signal.<br>Discuss the safest routes for him to come to school. | F 1370F *First Film on Finding Your Way to School Safely* |
| VI | COVERING COUGHS AND SNEEZES | The child should be able to: | |
| | A. Droplets of moisture from coughs and sneezes carry germs to others. | Demonstrate what he should do when he coughs or sneezes. | Song: *"This is the Way..." from LET'S SING WITH ELLA JENKINS, Band 2* |
| | B. Always cover a cough or sneeze with a tissue or your hand. | | |
| | C. Staying home at the beginning of a cold may prevent its spread to others or its development into a more serious illness. | Discuss what he should do and why if he isn't feeling well. | |
| VII | WASHING HANDS | | |
| | A. Harmful germs can be washed away when we wash our hands. | Discuss when he should wash his hands. | |
| | B. It is most important to wash the hands before eating, before helping prepare food, and after using the toilet. | Demonstrate the best way to wash his hands. | Pantomime song: *"This is the Way.." from LET'S SING WITH ELLA JENKINS, Band 2* |

Materials: Tannenbaum and others, *HOT AND COLD, Teacher's Manual, Pupil's Recortext, and Equipment*
Tannenbaum and others, *WEATHER, Teacher's Manual, Pupil's Recortext, and Equipment*
Elementary Science Study, *EGGS AND TADPOLES, Teacher's Manual and Equipment*
Elementary Science Study, *GROWING SEEDS, Teacher's Manual and Kit*
Byrd and others, *HEALTH 1, SECOND EDITION, Teacher's Edition*

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| I | HOT AND COLD<br>A. Some things are hot.<br>B. Some things are warm.<br>C. Some things are cold.<br>D. The skin can be used to measure the relative temperature among several items. It can compare hot, warm, and cold.<br>E. A thermometer can be used to measure the temperature of an object. | The child should be able to:<br>Use a color code to show whether pictured objects are hot, warm, or cold.<br>Count the number of items in each category (hot, warm, or cold) and record the total.<br>Record the relative temperature of water (cold, warm, or hot) by using a color code that corresponds to the temperature.<br>Arrange pictured objects in a scale from 1 to 6 (coldest to hottest) according to the temperature of the object.<br>Locate the scale and indicator on various kinds of thermometers (room, meat, clinical, and outdoor). | Refer to *Teacher's Manual, HOT AND COLD* |

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| | F. Temperature changes are shown on a thermometer by the movement of an indicator.<br>1. When the temperature rises, the indicator column goes up.<br>2. When the temperature lowers, the indicator goes down. | Record the level of the indicator of a thermometer at room temperature by filling in the indicator column on a picture of a thermometer.<br><br>Compare level of the indicator on a thermometer at room temperature, when the bulb of the thermometer is submerged in hot water and when the thermometer has been removed from the hot water for a few minutes.<br><br>Compare the level of the indicator on a thermometer at room temperature when the bulb of the thermometer is submerged in cold water and when the thermometer has been removed from the cold water for a few minutes.<br><br>Record and compare the results of the readings.<br><br>State his conclusions concerning the movement of the indicator column on a thermometer. | |
| | G. Temperatures can vary from place to place within a classroom. | Observe and record the temperature in various parts of the classroom (against a window pane, near a light bulb, the top of a radiator, inside a closet or desk drawer, inside a clutched palm). | |

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| | H. Outdoor temperatures may vary depending on the conditions.<br>1. Amount of sunlight<br>2. Amount of shade<br>3. Time of day | Observe and record outdoor temperatures by filling in the indicator columns of the thermometer at three different times of the day.<br><br>Observe and record the outdoor temperature at the same time each day for ten days by filling in the indicator column of the thermometers. | |
| II | THE WAY YOU LOOK<br>*Health 1 (pp. 22-24; 36-49)* | The child should be able to: | Refer to *"For You to Do"* sections of *Health 1.* |
| | A. One's hands should be washed often. | Demonstrate the washing of hands and the cleaning of nails with a brush. | |
| | B. Fingernails should be kept trimmed and clean. | | |
| | C. Make a habit of washing hands before eating and after using the toilet. | Discuss the reasons for washing hands before meals and after using the toilet. | |
| | D. Good dental care is important. | Demonstrate the proper way to brush teeth. | F 1380E *Teeth Are to Keep* |
| | | Discuss what a dentist does. | FS 2399S-4 *A Visit to the Dentist* |
| | E. Cleanliness is important for good health and appearance. | Discuss the different kinds of baths one may take.<br><br>Discuss the importance of wearing clean clothes. | |

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| | | Make a list with classmates of ways to take care of clothes. | |
| III | WEATHER | The child should be able to: | Refer to *Teacher's Manual, WEATHER* |
| | A. Clouds are one weather indicator. | Describe the kind of day that is represented in a picture that has clouds; some clouds; no clouds.<br><br>List facts not shown in the pictures that are necessary to accurately describe the day.<br><br>List the kinds of things that can or cannot be done on each day. | |
| | B. Weather conditions can be recorded: clouds, precipitation, temperature, wind. | Record the weather for a week by using a picture code [WIND VELOCITY (no wind, little wind, strong wind); SKY CONDITION (no clouds, a few clouds, overcast); PRECIPITATION (rain, snow)]. Record the temperature at a given time each day by filling in the indicator columns on a picture of a thermometer. | F 1450D-4 *The Wind* |
| | C. The amount of rain and snow that falls can be measured. | Measure the amount of water collected in a rain gauge. | F 1450D *The Rain* |
| | D. Rain is water that falls from clouds. | Compare various clear liquid samples (including water) with rain. State conclusions. | F 1268 *Whatever the Weather*<br><br>A weather chart may be kept for the remainder of the year. |

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| | E. Clouds are generally tiny drops of water. | | FS 2317M-4 *Where Do Clouds Come From?* |
| | F. Water rises when it evaporates. | Observe and discuss the differences in the position and condition of a drop of water on a plate over a short period of time (1/2 hour). | |
| | G. Water can evaporate into the air. | Record the time when a drop of water was placed on a plate and the time when the drop of water has completely evaporated. | FS 2317M-2 *How Does Water Get Into the Air?* |
| | H. Water from the earth evaporates; it rises upward to become clouds; water in the clouds returns to the earth as rain. | Discuss the repetitive pattern of the water cycle. | |
| IV | THE SAFE WAY FOR YOU *(pp. 13-15; 20-35)* | The child should be able to: | Refer to *"For You to Do"* sections of *Health 1*. |
| | A. Traffic lights and signs, policemen, patrol boys and railroad crossing signs help us to be safe. | Make pictures of some of the people and things that help them to be safe. | Garrett A. Morgan, a black, invented the automatic traffic signal. |
| | B. Be careful and alert when approached by strange people and animals. | Discuss what he should do when a stranger offers him a ride, candy, money, etc.<br><br>Discuss why it is unsafe to play with strange animals. | F 1474Q *Dangerous Stranger* |

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| | C. Safety practices are important when riding in a bus or an automobile. | State three ways to be safe in a bus or an automobile. | |
| | D. Fire drills are important for our safety. | Discuss why it is important to have fire drills. | |
| | E. Know the safe way to carry pointed objects. | Demonstrate the safe way to carry a pencil and a pair of scissors. | |
| V | EGGS AND TADPOLES | The child should be able to: | Refer to *Teacher's Guide* for *EGGS AND TADPOLES*. |
| | A. Frogs change form: one cell, the tadpole, the adult frog. | Discuss his observations of the appearance of the frog eggs as they develop. Compare his observations with those of his classmates. | |
| | B. Part of the life cycle of the frog must be spent in the water. | Discuss what would happen if the frog eggs or the tadpoles were left out of water. | |
| | C. Tadpoles live best in water which nearly duplicates that of their natural pond water. | Discuss the results of a class experiment raising tadpoles in different kinds of water (tap, pond, or rainwater) to discover which one is best. | |

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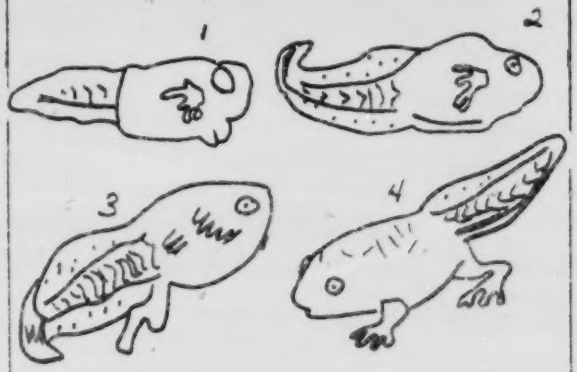
| | | Draw pictures of the sequential changes that occur as the tadpole develops.   | |
| | | Draw pictures of the development of the frog from eggs to adult form. | F 1450M *The Tadpole Tale* |

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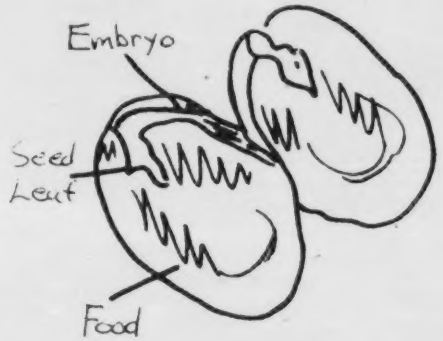
| VI | GROWING SEEDS | The child should be able to: | Refer to *Teacher's Guide* for *GROWING SEEDS.* |
| | A. Seeds grow into new plants. | Define what a seed is in terms of what a seed does. | FS 2251V *Seeds Grow Into Plants* |
| | B. Seeds are different in shape, size, color, texture and outer covering. | Observe the differences among kinds of seeds. Group the seeds in various classifications: color, size, shape, texture. | FS 2250T *Plants Grow* |
| | C. Germination is the sprouting of the embryo and the beginning of growth. | Discuss what he sees inside a bean or pea seed after it has begun to germinate.<br><br>Point to the seed leaf and other parts of the plant embryo.<br><br>  <br> | Open a germinating seed every day to observe the development of the embryo. |
| | D. Some seeds are found in pods. | Predict what is inside a bean or pea pod after shaking it and open the pod to reinforce his predictions. | |

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| | E. Seeds travel. They go over all the earth.<br>1. Wind and water carry seeds from place to place.<br>2. Animals pick up seeds and carry them. Some seeds get stuck in their fur.<br>3. Some seeds have wings and parachutes which enables the wind to pick them up. | Tell why plants grew from soil into which no seeds were planted but that had been watered. | FS 2248E *Seeds Travel*<br>SFS 2550H-14 *The Wind and the Seeds* |
| | F. Seedlings grow and change. | Plant a seed and cultivate a plant.<br>Make a graph of his seedling's growth by cutting, at regular intervals (perhaps once a day/ week), a strip of paper to match the height of the plant.<br>Use his graph to answer some of his questions concerning the rate of growth of the plant.<br>Compare his graph with graphs of some of his classmates. | |

Materials: Tannenbaum and others, *BALANCES, Teacher's Manual, Pupil's Recortext, and Kit*
Tannenbaum and others, *MAGNETS, Teacher's Manual, Pupil's Recortext, and Equipment*
Elementary Science Study, *BUTTERFLIES, Teacher's Manual*
Elementary Science Study, *LIFE OF BEANS AND PEAS, Teacher's Manual*
Byrd and others, *HEALTH 2, SECOND EDITION, Teacher's Manual*

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| I | BALANCES | The child should be able to: | |
| | A. Some things are heavier than others. | Classify pictures of objects into four groups using a four-point scale: very heavy, heavy, light, very light. | Refer to *Teacher's Manual* for *BALANCES*. |
| | B. Lifting objects is not always a valid means of comparing their weights. | Compare the weights of various metal rings by lifting them. Record the results by ranking them from the lightest to the heaviest.<br><br>Compare the results of his classmates' classification with his own.<br><br>Discuss why lifting things is not always a reliable way of finding out which is the heavier and which is the lighter of two objects. | |
| | C. A balance can be used to compare the weights of objects. | Compare the weights of the same metal rings by using a balance. Record the results by ranking the rings from the lightest to the heaviest. | |

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| | | Compare his results with those of his classmates.<br><br>Discuss why the balance is a more accurate means of determining weight than lifting is. | |
| | D. The greater the size of the object, the heavier the object providing the objects are made of the same material. | Predict the proper sequence of weights of metal rings from the appearance.<br><br>Test the predictions by using the balance. | |
| | E. When objects are not made of the same material, you cannot predict how heavy they are from their size. | Compare all the rings on the balance and record the results. | |
| | F. A balance can be used to establish the relationship between two or more weights. | Compare the relationship between two or more weights. | |
| | G. Objects of identical weights can be used as units of weight. | Weigh the metal rings by balancing them with the cardboard pieces (units of weight) and record the results. Example: red ring -- 21 small pieces or 21 grams.<br><br>Rank the rings from the lightest to the heaviest according to how many grams each weighs. | |
| | H. Standard units of weight can be used to weigh objects. | Use the balance and cardboard weights to weigh other objects. | |

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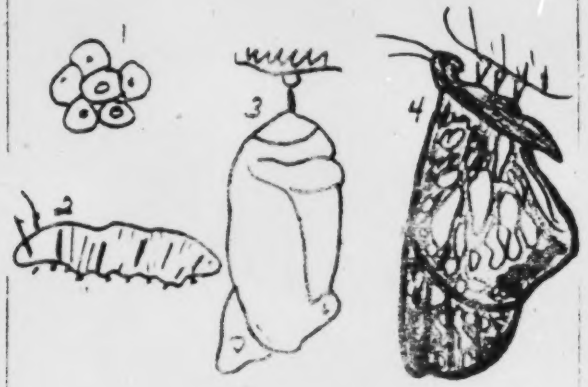
| II | BUTTERFLIES | The child should be able to: | |
| | A. A butterfly goes through several complete changes as it develops: egg, larvae (caterpillar), pupa (chrysalis), and the adult butterfly.   | Describe butterfly eggs including reference to size, shape, and color. | FS 2250Y *Butterflies Grow* |
| | B. Caterpillars feed on the leaves of plants. | Keep a record of all the things he observes about the larva stage. Include how he walks, eats, sheds its skin, and becomes a chrysalis. | TEACHER NOTE: Monarch larvae will eat only milkweed plants.<br>Black swallowtail larvae eat the plant leaves of parsley, carrot greens, celery and Queen Anne's lace. |
| | C. Baby animals that do not resemble the parents when young, do resemble them at maturity. | Discuss the differences between the caterpillar and its mother. | |

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| | D. When the larva is large and mature enough, it turns into a pupa. | Describe what happens as a caterpillar pupates.<br><br>Describe the emergence of the adult butterfly from the pupa.<br><br>Describe the four stages of development of the butterfly.<br><br>Draw pictures of and describe four stages of development of the butterfly.<br><br>Observe and describe the mating of butterflies. | |
| III | WHAT TO EAT<br>*(HEALTH 2 -- pp. 22-24; 70-85)* | The child should be able to: | |
| | A. Breakfast should include milk, fruit, cereal, and a protein food. | Make a chart showing the kinds of foods that constitute a good breakfast.<br><br>Use pictures from magazines to simulate a sample breakfast, choosing one food from each food group. | Refer to "For You to Do" section of *HEALTH 2*. |
| | B. A good breakfast gives one energy for work and play. | Discuss how he feels when he doesn't eat breakfast or misses a meal.<br><br>Make posters of a good lunch and a good dinner using foods from each food group. | F 1378 *Healthy Families*<br>FS 2233F *Food for Good Health* |

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| | C. Most meat foods come from animals. Some meat foods come from plants. | Find pictures of meat or meat foods. Match them with the animals or plants they come from. | FS 2233B *Where Food Comes From* |
| | D. One should eat two servings of meat each day. | | |
| | E. Plants provide a large variety of fruits and vegetables. | Classify fruits and vegetables into three groups: (1) Those We Eat Raw; (2) Those We Cook; (3) Those We Eat Both Ways. | |
| | F. One should eat at least four servings of fruits and vegetables each day. | | |
| | G. Fruits and vegetables should be washed before eating them. | Discuss why fruits and vegetables should be washed befor | Discuss why fruits and vegetables should be washed before eating them. |
| | H. Grain foods provide energy. | | Make a list of foods that come from grains. |
| | I. Four servings of grain foods should be eaten each day. | | |
| | J. Milk is an important food. Many foods are prepared with milk. | Make a chart of milk and milk products. | |
| | K. Children should drink about a quart of milk each day. | | |
| IV | LIFE OF BEANS AND PEAS | The child should be able to: | |
| | A. Many foods we eat are seeds or structures that contain seeds (string beans). | Make a list of the seeds we eat. | Refer to *Teacher's Manual* for *THE LIFE OF BEANS AND PEAS*. |

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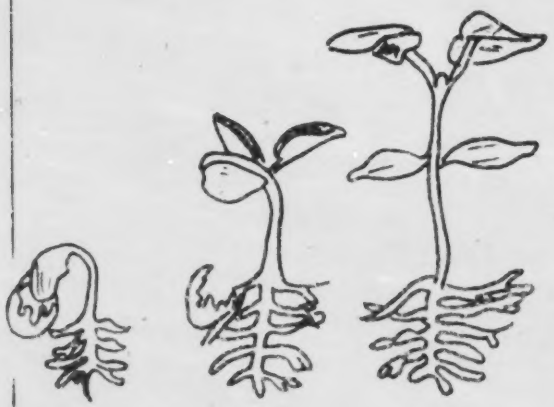
| | B. Seeds differ in size, shape, color, texture, and outer covering. | Separate seeds into groups that are alike in size and shape, but not in color.<br><br>Predict whether or not the seeds that look alike produce similar plants. | |
| | C. Germination is initiated by warmth, moisture, and air. | Germinate several different kinds of seeds. Look at the sprouts and compare them.<br><br>Find the seed coat, stored food, and the embryo (small new plant). | |
| | D. Seedlings grow and change into plants like the ones they come from. | Plant a seed and cultivate it.<br><br>Discuss what happens to the seed as the plant grows. | FS 2251V *Seeds Grow Into Plants*<br><br>FS 2250T *Plants Grow* |
| |  | Pull up a few young plants. Discuss whether the seed is still there. Observe the roots. Discuss the purpose of the roots.<br><br>Draw a picture of the plant at this stage. Label the root, stem, and leaves.<br><br>Make a graph of his plant's growth by measuring it with a ruler and graphing the number of inches grown, or by cutting a strip of paper to match its height.<br><br>Keep a chart with other classmates that summarizes the growth of the plants. | |

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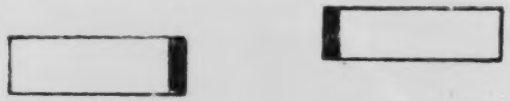
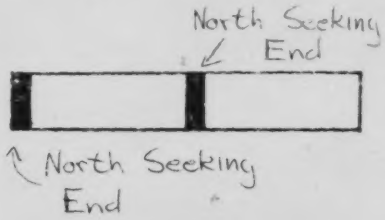
| | E. As some bean plants grow and mature, pods will develop. | Discuss, after observing the translucent pods on successive days, the change in size of the seeds. | |
| | F. When seeds are mature and ready for planting, the plant itself will seem to be dying. | Plant the seeds from the plant that he has grown. | |
| | G. Seeds produce plants which produce more seeds. | Predict what will happen as his second generation plant grows. | |
| | | Compare the sequence of development of his second generation plant with that of his first. | TEACHER NOTE: Plants will take about three months to mature. |
| V | MAGNETS | The child should be able to: | |
| | A. Magnets may come in different sizes and shapes. | | Refer to *Teacher's Manual* for *MAGNETS*. |
| | B. Magnets can push other magnets when like ends are facing. | Draw a picture of what happens when like ends of a magnet are placed together.  | FS 2305M-5 *Different Kinds of Magnets*<br>FS 2305M-8 *What is Magnetism?* |
| | C. Magnets can pull other magnets when unlike ends are facing. | Draw a picture of what happens when unlike ends of a magnet are placed together.   | |

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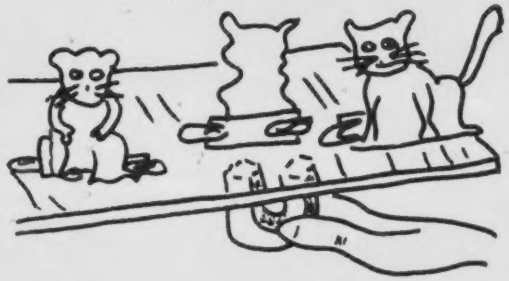
| | D. The ends of unmarked magnets can be identified. | Show how he will test his unmarked U magnet for like and unlike poles. | |
| | E. Magnetism may pass through various materials. | Classify into groups after experimenting, materials that magnetism will pass through and materials that magnetism will not pass through. | FS 2305M-7 *Magnets Can Attract Through Objects*<br>Make a stage of cardboard or glass. Cut out paper figures with each having a base so it will stand up. Place a paper clip on each edge of the base. Make the figures move by using magnets under the stage<br>  |
| | F. A magnet attracts objects made of iron and steel. | Classify into two groups objects that can be attracted by a magnet and objects that cannot be attracted by a magnet. | |
| | G. Like ends of free-swinging magnets come to rest pointing in the same directions. | Discuss what he has observed concerning the position of several free swinging magnets. | |
| | H. All compass needles point in the same general direction. | Generalize that the needles of all compasses, when free to move, come to rest in the same direction. | |

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| | I. The needle of a compass is a free-moving magnet. | Show that the compass needle is a magnet by (1) demonstrating that suspended magnets and compass needles point in the same way; (2) demonstrating the attraction of the compass needle for steel or iron objects. | FS 2305M-6 *Magnets Help Find Direction* |
| | J. The earth acts as a giant magnet. | Discuss how the earth acts as a giant magnet. | |
| VI | HOW TO BE SAFE<br>*(HEALTH 2 -- pp. 13-15; 22-37)* | The child should be able to: | |
| | A. Each separate sign or signal is a special safety measure. | Discuss the traffic signals and signs. Tell how they help us. | Refer to "For Yor To Do" section of *HEALTH 2*. |
| | | Draw a picture of two of the traffic signs. | T 6570 *Safety Signs on the Street* |
| | B. Firemen, policemen, safety patrol boys, and bus drivers are employed to promote safety. | Tell how firemen, policemen, safety patrol boys, and bus drivers help us. | |
| | C. Fire drills are for our safety. | Discuss the fire drill routine at school. Include what should be done when the fire drill bell rings. | |
| | D. There are safety practices to observe at home. | Make a list of things he can do to make his home safe. | |
| | E. Bicycle riders should know how and where to ride. | Make a list with classmates of safe places to ride a bicycle in his neighborhood. | F 1450D-1 *Safety As We Play* |

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| | F. Be cautious in selecting places and equipment for play. | Discuss the hazards of playing in abandoned houses. Discuss the other places that children should not play.<br><br>Draw pictures of safe places and safe equipment for play. | F 1370E *Let's Play Safe* |

## *PRIMARY 3*

MATERIALS: Tannenbaum and others, *GROUPS, Teacher's Edition, Pupil's Recortext, and Kit*
Tannenbaum and others, *AIR, Teacher's Edition, Pupil's Recortext, and Kit*
Elementary Science Study, *BRINE SHRIMP, Teacher's Edition, and Equipment*
Elementary Science Study, *CHANGES, Teacher's Edition*
Byrd and others, *HEALTH 2, SECOND EDITION, Teacher's Edition*

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
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| I | GROUPS | The child should be able to: | |
| | A. Objects may be grouped according to similarities. | Group colored geometric shapes according to size, shape, and composition (solids, cut-out centers). | Refer to *Teacher's Manual* for *GROUPS*. |
| | B. There are many ways of grouping the same objects. | Group the geometric shapes in other ways. State and record why they were grouped in these ways.<br><br>Group other objects in different ways: texture, weight, and use. State why the objects were so grouped. | |
| | C. Things can be grouped as living and non-living.<br>1. Living things grow and reproduce similar living things.<br>2. Non-living things do not grow and reproduce. | Place in the proper category six living and six non-living objects in the classroom. | |

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| II | BRINE SHRIMP | The child should be able to: | |
| | A. Brine shrimp eggs look like very fine coffee grounds. | Compare his observations of the appearance of the brine shrimp with those of his classmates.<br><br>Predict the size of the animal in relationship to the size of the egg from which it comes. | Refer to *Teacher's Guide* for *BRINE SHRIMP*. |
| | B. Brine shrimp eggs hatch in varying concentrations of salt water. | Perform an experiment with classmates using varied amounts of salt to see how much salt is needed to hatch the brine shrimp.<br><br>Describe the appearance of the newly hatched brine shrimp.<br><br>Discuss evaporation. | |
| | C. Brine shrimp shed their shells as they grow. | Describe the shedding of the shells of brine shrimp. Include the reason for the shedding. | |
| | D. Salt water algae and bacteria are the natural food of brine shrimp. | Compare the amount of food a child eats with his size<br><br>Compare the size of the brine shrimp with the amount of food it needs.<br><br>Perform an experiment with classmates to find out how temperature affects the lives of brine shrimp. | |

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| III | CHANGES<br><br>A. All of life is change.<br>1. Some changes are man-made.<br>2. Some changes occur without man's intervention.<br><br>B. Change may be gradual or spontaneous.<br><br>C. Water plays a part in influencing a change in foods.<br><br>D. There are various types of changes that occur.<br>1. Melting and freezing<br>2. Drying out<br>3. Chrystalization and solution making<br>4. Sprouting<br>5. Metamorphosis<br>6. Decaying and decomposition | The child should be able to:<br><br>Make some predictions about what changes will happen to things that are left alone.<br><br>Record predictions on a chart.<br><br>Keep a record of the changes that occur in his *CHANGES* container. Describe the changes.<br><br>Demonstrate how one might find out whether foods have water in them.<br><br>Perform an experiment with a classmate to show the effect of water on some foods. Keep a record of the procedure and the changes that occur.<br><br>Report in detail on his *CHANGES* container, what he put in, what happened, and why he thinks it happened. | Refer to *Teacher's Guide* for *CHANGES*. |

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| | E. Various preserving methods prevent food from spoiling. | Discuss two methods of food preservation telling what happens to the microbes.<br><br>Perform an experiment to show how temperature affects changes. | FS 2233D *Keeping Food from Spoiling* |
| IV | HOW YOU GROW<br>*(HEALTH 3 -- pp. 18-20; 52-65)* | The child should be able to: | |
| | A. Growth inside the body takes place along with growth that is more easily observed. | Discuss how he knows he is growing. Tell how he knows how much he is growing. | Refer to "Can You Find Out" and "Things to Do" sections of *HEALTH 2*. |
| | B. Children may differ in weight and height even though they are the same age. | Compare his weight with two of his classmates that are the same age as he.<br><br>Keep a monthly record of his height and weight. | |
| | C. The proper foods, sleep, and exercise are needed for growth and good health. | Tell why food, sleep, and exercise are important for good health. | |
| | D. The pattern for growth is inherited. | Predict his height in relationship to his parent's height. | |
| | E. Good dental hygiene is important. | Discuss what he can do to have good teeth. | F 1380E *Teeth Are to Keep* |
| V | AIR | The child should be able to: | |
| | A. Air can press down on water. | Demonstrate that air presses down on water by using air to push a small indentation | Refer to *Teacher's Manual* for *AIR*. |

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| | | into the surface of the water and by blowing bubbles in the water. | |
| | B. Air occupies space. | Discuss the results of an experiment of pushing an inverted cup into the water in terms of what happened to the water.<br><br>Discuss what happens when air is sucked out of an inverted cup that has been pushed into the water.<br><br>Discuss what happens when air is blown into an inverted cup that has been pushed into the water.<br><br>State his conclusions from the above experiments. | |
| | C. Air is pushed out of a container when water is poured into it. | | Demonstrate what happens to the air in a cup when water is poured into it. Record the results. |
| | D. When more air is added to a closed container, the pressure is increased. When air is removed from a closed container, the pressure is decreased. | Draw pictures that show what happens to a balloon that is inside the container when air is blown into the container, first with the tube open and then with it closed.<br><br>Discuss his observations. | Draw pictures that show what happens to the balloon that is inside the container when air is sucked out of a container, first with the tube open and then with it closed. Discuss observations. |
| | E. There is a layer of air around the earth. | Write a plan for testing to see whether there is air in a sponge, a piece of cloth, and a piece of pumice. | |

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| | F. The faster air moves, the harder it pushes. | List at least three ways he can cause air to move.<br><br>Discuss his observations of the test of blowing on a pinwheel to make it move. | |
| VI | SAFETY FIRST<br>*(HEALTH 3 -- pp. 29-31; 110-123)* | The child should be able to: | |
| | A. Every member of a family is responsible for safety in the home. | Make a list of things he does each day at home and at school to stay safe. | Refer to "Can You Find Out" and "Things To Do" sections of *HEALTH 3*. |
| | B. Knowing and following school rules is important to avoid accidents. | | Collect news stories of home accidents for a bulletin board display.<br><br>Make posters depicting safe and unsafe ways to carry out tasks at home. |
| | C. The correct procedure for fire drills should be followed. | Make a list with classmates of steps to follow in case of a fire at school. | F 1369X *In Case of Fire -- Fire Drills and Fire Safety* |
| | D. There are safe ways to do things when on a bus, in an automobile, on foot, or on a bicycle. | Dramatize safe and unsafe behavior in a car and on a bus.<br><br>Discuss traffic rules and other rules for bicycle safety. | |
| | E. We should obey safety helpers: patrol boys, policemen, traffic signs and signals. | Discuss the safety rules one should follow when walking.<br><br>Identify the common traffic signs he sees on the way to school. | T 6570 *Safety Signs on the Street* |

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| | F. Follow the safety rules when playing. | Avoid accidents while playing because he follows safety rules. | F 1370E *Let's Play Safe*<br><br>Make a safety picture book about safety rules on the playground. Write a safety rule for each picture. |

## *GRADE 4*

Textbooks: Brandwein and others, *CONCEPTS IN SCIENCE -- Orange*
Byrd and others, *HEALTH 4*

Materials: Tannenbaum and others, *SOUND (Original Kit, Teacher's Manual, and Pupil's Recortext)*
Crowley and Heston, *MICROGARDENING, Teacher's Manual*
Weston and Dawson, *HANDBOOK OF SOME COMMON MOLDS*
National Audubon Society, *A PLACE TO LIVE*
National Audubon Society, *A PLACE TO LIVE, Teacher's Manual*

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| I | SOUND (pp. 1-39) *(CONCEPTS IN SCIENCE -- Orange)*<br><br>A. Sound is made by a vibrating object.<br><br>B. The pitch of a sound depends upon the rate of the vibrations.<br><br>C. Sound travels in waves, by molecular motion.<br><br>D. The molecular theory explains the behavior of sound in a solid and a gas.<br><br>E. A loss or gain of energy affects molecular motion. | The student will be able to:<br><br>Describe the conditions needed for making sound.<br><br>Tell how the pitch of a sound can be raised or lowered when the length, thickness or tightness of the vibrating object is changed.<br><br>Use the molecular theory and wave theory to explain how sound travels. | USE EIS UNIT, *SOUND, Kit, Teacher's Manual and Pupil's Recortext* WITH THIS UNIT.<br><br>SFS 2588B-1 *Listen! What Do You Hear?*<br>SFS 2588B-2 *How Sounds Are Made*<br>F 1260P *Learning About Sound*<br>FS *Causes and Nature of Sound* (B-21 -- in school)<br>FS *How Sound Travels* (B-22 -- in school)<br>SFS 2588B-3 *How Sound Travels*<br>SFS 2588B-5 *Musical Instruments Make Special Sounds*<br>R 4755S *The Science of Sound*<br>O 926 *Sound Vibrations* |

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| | THE EAR (pp. 70-85)<br>*(HEALTH 4)* | | |
| | A. Hearing takes place when sound waves are collected by the ear and sent to the brain. | Given a diagram of the ear and its parts, label the parts and give a brief explanation of how sound travels through the ear. | FS 2326E-1 *The Ears and Hearing*<br>SFS 2588B-4 *How We Hear*<br>FS *How Your Ears Work* (B-7 -- in school) |
| | B. To maintain good hearing one must take proper care of the ears and protect them from injury. | List three ways to care for your ears. | |
| II | LIGHT (pp. 40-71)<br>*(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | |
| | A. Objects become visible as light is reflected from them to the eyes. | Explain what is necessary to see an object. | F 1259E *Science of Light*<br>FS 2302 *Light and How It Travels* |
| | B. Light and sound are different forms of energy. | List ways light and sound are alike and different. | 0 924 *Images Formed by Mirrors and Lenses* |
| | C. Light may be bent as it passes from one material to another. | Name two materials that bend light rays. | 0 922 *Prisms* |
| | D. Light energy has properties of wave and particle. | Given a series of pictures of objects, recognize whether each object reflects, absorbs, bends or stops light. | |
| III | WATER CYCLE (pp. 72-113)<br>*(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | |
| | A. Evaporation requires an increase in molecular energy. | | FS *How Does Water Get Into the Air?* (A-6 -- in school) |

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| | B. Condensation requires a decrease in molecular energy. | Explain evaporation and condensation by the molecular theory. | FS *What Is Weather?* (B-25 -- in school) |
| | C. Rising air cools, and its water vapor condenses to form clouds. | Explain how clouds are formed. | FS *What Makes the Weather?* (B-26 -- in school) |
| | | | TR 6505B *Weather* |
| | D. Rain may form when cloud droplets merge. | Explain how rain is formed. | F 1235B *Water Supply* |
| | | | F 1245C *Origins of Weather* |
| | E. The water supply is the result of the cycle of evaporation and condensation. | Draw the diagram of the water cycle and give a brief explanation. | F 1235E *Water and What It Does* |
| | | | F 1235F *Water -- Coming and Going* |
| | | | Keep a record of how much water you use in a day. Make a list of the reasons why we need so much water. Discuss how you might save some of this water each day. |
| IV | AIR (pp. 114-151) *(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | |
| | A. Matter takes up space. | Demonstrate one way to show that matter takes up space. | F 1272F *The Air Around Us* |
| | | | F 1272G *Air and What It Does* |
| | B. Substances may react and form new substances. | Explain what causes objects to rust. | FS 2305W-1 *The Physical Characteristic of Air* |
| | C. Processes releasing energy in living things require oxygen. | List reasons for the need of oxygen. | FS 2305W-4 *The Composition of Air* |
| | | | FS 2305W-5 *The Importance of Air in Nature* |
| | D. Processes of green plants return oxygen to the air. | Explain why green plants are important. | FS 2587A-2 *Earth's Blanket of Air* |
| | | | F 1256H *How Does a Candle Burn?* |

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| | | | Fill a tin can with clean water and place it outside. In a few days strain the water and look carefully at what is left. What sort of material is it? Where do you think it came from? |
| V | SOIL (pp. 152-191)<br>*(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | |
| | A. The force of expansion of water in rock breaks down rock. | | F 1235E *Water and What It Does*<br>FS 2314F *Saving Our Soil*<br>FS 2315A *What We Need* |
| | B. The sun's energy and growing plants break down rock. | List two forces that break down rock. | FS 2318B-3 *Changing the Face of the Earth* |
| | C. The energy of moving water wears away the earth's surface. | Demonstrate how running water moves soil, rock and other bits of material from one place to another. | SP 3180T *Soil Conservation Measures*<br>F 1279B *Earthquakes and Volcanoes* |
| | D. The energy of moving water builds up the earth's surface. | | |
| | E. Vegetation reduces the rate of erosion. | Discuss how plants reduce erosion. | |
| | F. Pressures on and in the earth may raise the earth's surface, forming mountains. | Explain how mountains are formed. | |
| | G. The earth's matter is in continuous change. | | |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
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| VI | PLANT GROWTH (pp. 192-233) *(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | USE ESS *MICROGARDENING, Teacher's Manual* WITH THIS UNIT. ORDER ALL EQUIPMENT FROM THE WAREHOUSE. |
| | A. Green plants obtain matter for growth from their environment. | Name three things plants need for growth. | |
| | B. Green plants are dependent on a particular environment. | | Construct a miniature terrarium and list reasons fo. its thriving or failure. |
| | C. Green plants make their own food from substances in their environment. | Explain briefly the cycle of growth and decay of a tree. | F 1359H *Plants Make Food*<br>SFS 2585P-1 *Plants and How They Grow*<br>F 1299D *The Terrarium*<br>FS 2318F-1 *How Soil is Formed* |
| | D. Matter from the environment is used for growth by all living things. | | |
| | E. Bacteria and other organisms act on dead plants and animals, returning their matter to the environment. | | Discuss the value of trees to man. Why should certain land be used to grow trees? |
| | F. A living thing is dependent upon both living and non-living parts of its environment. | Name three animals. For each animal name an environment in which that animal cannot live. | |
| | G. Living things are adapted to particular environments. | | |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
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| VII | LIFE CYCLE (pp. 234-279)<br>*(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | |
| | A. Living things depend on other living things for food, in food chains. | Draw a diagram of an example of the food chain of an animal. | F 1340 *The Sunfish*<br>F 1783F *Water Game and Shore Birds* |
| | B. Every species of animals has a life cycle in which the same pattern of development from egg to adult is repeated. | Record and draw the growth changes of an animal you have observed. | F 1791 *Toad and Frogs*<br>FS 2293W *Mr. and Mrs. Mallard and Their Family* |
| | C. During each stage of its life cycle, an animal adapts to a special environment. | Compare the adaptions of the salmon and duck at each stage of its life cycle. | F 1301B *Animal Habitats*<br>F 1332A *Bird Migration*<br>F 1299C *Where Should a Squirrel Live?* |
| | D. Different animals are adapted to living in different environments. | | 0 110 *Mallard Duck*<br>0 249 *Junco, Slate-colored*<br>0 410 *Toads, Frogs and Salamanders* |
| | E. *"A living thing reproduces itself and develops in a given environment."* | | |
| VIII | ECOLOGY (pp. 280-327)<br>*(CONCEPTS IN SCIENCE -- Orange)* | The student will be able to: | USE *A PLACE TO LIVE, Teacher's Manual* AND *Pupil's Manual* (NON-CONSUMABLE) AS A SUPPLEMENT TO THIS UNIT OR AS A UNIT BY ITSELF. THE WALKS ARE THE MOST IMPORTANT PART OF THE UNIT. THEY WILL HELP THE CHILDREN DEVELOP AN AWARENESS AND AN APPRECIATION OF THEIR ENVIRONMENT. |
| | A. Living things depend upon matter and energy from their environment. | | |

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| | B. Living things are adapted to particular environments. | Compare ocean food chains with land chains. | FS 2247A *Life in Ponds, Lakes, and Streams* |
| | C. Living things and their environment are interdependent parts of a system -- the ecosystem. | State what an ecosystem is. | FS 2247F *Small Fresh-Water Animals and Insects*<br>FS 2250N-2 *Let's Explore a Pond* |
| | D. In modifying the environment man modifies the nature and distribution of organisms. | List ways man's activities may harm the ecosystem. | FS 2250N-3 *Let's Explore a Stream*<br>F 1351M *Marvels in Miniature*<br>F 1388Q *Our Land Needs Your Help* |
| IX | DRUG ABUSE EDUCATION *(HEALTH 4)*<br>NOTE: Although this unit appears at the end of the outline for Grade 4, it may be used at anytime during the school year. The staggered use of this unit would make it easier for teachers to secure the suggested audio-visual materials. | | |
| | A. Care of the body is important for good health. (pp. 38-53, 109-111, 172-176) | The student will be able to: | |
| | 1. Signs of good health | List signs of a healthy person | School Transparency: *Human Skin in Cross Section* illustrates the need for clean skin. |
| | | Make posters illustrating good posture when standing and when sitting. | Use a chart or diagram to show the structure of a healthy tooth. |
| | | | Use a Snellen chart to test the children's vision. Stress the importance |

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| | | | of wearing glasses when necessary.<br><br>Use the "whisper test" to spot check hearing. |
| | 2. Good health habits | Discuss why sleep is so important to good health. | Prepare a cleanliness chart covering one week. Have students keep their own record.<br><br>F 1420D *Food That Builds Good Health*<br><br>SFS 2584F *Watch What You Eat*<br><br>Discuss what kinds of food are necessary for a good diet.<br><br>Review safety rules of your school. |
| | | Discuss acceptable ways to control emotions. | Discuss how changes in emotion are influenced by changing circumstances. |
| | 3. Medical care | Discuss the importance of regular check-ups by the doctor and dentist. | Invite the school nurse to talk to the class about the importance of immunization.<br><br>Look up the early history of vaccination and the work of Edward Jenner. |
| | B. Failure to care for the body leads to poor health. (pp. 172-176) | The student will be able to: | SFS 2584F-1 *Take Care of Your Body* |
| | 1. Signs of poor health | Discuss safety practices for protecting the eyes. | Find our how tooth decay can cause a general feeling of ill health. |

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| | | | Discuss the relationship between lack of coordination and accidents.<br><br>Make posters illustrating safety practices for protection of the eyes. |
| | | Discuss how the school physical education classes help insure proper exercise. | Discuss how impaired body functions and general poor health can lead to poor school work and poor sports performance. |
| | 2. Poor health habits | Develop his own list of poor health habits, and include ways of correcting these poor habits.<br><br>List his favorite foods and determine if they are healthful. | |
| | 3. Lack of proper medical care | Discuss how medicines are used to help the body. | Find out about health heroes such as Pasteur and Salk.<br><br>Find out what harmful effects such diseases as whooping cough, smallpox, and measles have and how immunization controls these diseases. |
| | C. Certain substances are harmful to health. | The student will be able to: | |
| | 1. Harmful use of prescribed medicines | Discuss how prescription medicines differ from non-prescription medicines.<br><br>Discuss the possible dangers of candy-flavored medicines. | SFS 2584B *Drugs: Friend or Foe*<br><br>SFS 2584F-2 *Helpful Medicines*<br><br>Teacher Reference:<br>*DRUGS: FACTS ON THEIR USE AND ABUSE, pp. 5-9* |

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| | | | Look up the history of medicines in an encyclopedia and find out what substances were used as medications throughout history.<br><br>Clip news items on fatalities due to misuse of medicines.<br><br>Make reports on harmful effects of overdosage of home medicines such as aspirin. |
| | 2. Harmful use of non-prescription medicines | Discuss how non-prescription medicines may be harmful. | SFS 2584F-3 *Drugs Can Be Dangerous*<br><br>Make a bulletin board display of pupils' stories of personal experience about proper and improper use of medicines. |
| | 3. Inhalation of volatile substances (a volatile substance is one that changes easily into a vapor) | List dangerous volatile substances.<br><br>Discuss how inhaling any volatile substance affects good health by referring to the list of signs of good health.<br><br>List immediate and prolonged effects that result from the inhalation of volatile substances. | Teacher Reference:<br>*DRUGS: FACTS ON THEIR USE AND ABUSE, pp. 33-35*<br><br>SFS 2584D-2 *Toxic Vapors: Why Sniff?* (preview first)<br><br>Discuss the reasons children might resort to glue sniffing.<br><br>Make a bulletin board display of pictures of harmful household substances. Bring out the proper way to use, store, and dispose of these substances. |

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| | | | Discuss the precautions that are taken to keep volatile substances from being sold to children. |
| | | Discuss safety practices for use when handling dangerous household substances. | Make posters illustrating safety practices for use with dangerous household substances.<br><br>Have pupils make a check of dangerous household substances in their homes to see that they are properly labeled and stored. |
| | 5. Tobacco and alcohol (p. 142) | Explain what is meant when we say a person is an alcoholic. | SFS 2584D-1 *Alcohol: Why Drink* (preview first) |
| | | Discuss how tobacco and alcohol can harm the body. | SFS 2584D *Tobacco: Why Smoke* (preview first)<br><br>F 1377R *Smoking -- It's Your Choice*<br><br>F 1377W-1 *I'll Be Seeing You*<br><br>Obtain pamphlets from health agencies describing the harmful effects of tobacco and alcohol use.<br><br>Discuss why people drink beer, wine, or whiskey.<br><br>Collect newspaper articles about automobile accidents resulting from the use of alcohol. |

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| | | | Discuss laws that have been passed about the advertisement and sale of cigarettes.<br><br>Read and discuss the warning on the side of a pack of cigarettes. |

## *GRADE 5*

Textbooks: Brandwein and others, *CONCEPTS IN SCIENCE -- Purple*

Byrd and others, *HEALTH 5*

Materials: Tannenbaum and others, *CHEMICAL CHANGE (Replacement Kit, Teacher's Manual, and Pupils' Recortext)*

Tannenbaum and others, *GEOLOGICAL PROCESSES (Replacement Kit, Teacher's Manual, and Pupils' Recortext)*

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|---|---|---|---|
| I | SPACE (pp. 3-51)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br><br>A. The gravitational pull on an object is measured by its own weight.<br><br>B. For every action there is an equal and opposite reaction.<br><br>C. Inertia makes objects remain at rest or continue in motion.<br><br>D. Space exploration depends on the laws of universal gravitation and the laws of motion.<br><br>E. Energy must be applied to produce an unbalanced force which results in a change of motion. | The student will be able to:<br><br>Compute the weight of various objects by suspending them from a spring dial.<br><br>Build a model Dry Ice engine and explain the forces of action and reaction.<br><br>Analyze a moon landing, explaining the dependence of moon exploration on the laws of gravitation, inertia and action and reaction.<br><br>Make inferences about the possibilities of life on other planets. | FS 2295W *Overcoming Gravity* (B-45 -- in school)<br><br>F 1244X-1 *Gravity, Weight, and Weightlessness*<br><br>F 1282D-4 *Why Communication Satellites?* |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
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| II | CHANGING EARTH (pp. 53-113)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br><br>A. Weathering and erosion continually break down the land.<br><br>B. Sediment continually builds up the land.<br><br>C. The earth is always changing.<br><br>D. Heat and pressure cause continuous changes within the earth.<br><br>E. Heat and pressure are continually changing the earth's crust.<br><br>F. The way in which rocks are formed determines their make-up.<br><br>G. Bodies in space are in continuous change. | The student will be able to:<br><br>Analyze the roles of weather, water, and plants in producing forces that wear away rock.<br><br>Identify the parts of a lichen and describe the function of each part.<br><br>Construct models to demonstrate shifting crusted layers.<br><br>Design models to illustrate sound waves traveling in a solid and sound waves traveling in air.<br><br>Demonstrate understanding of mountain-forming forces by completing open-ended questions in "Before You Go On" section of the text.<br><br>Classify rocks as igneous, metamorphic, or sedimentary. | USE *GEOLOGIC PROCESSES, Replacement Kit, Teacher's Manual, and Pupils' Recortext* WITH UNIT II.<br><br>FS 2318B-6 *Wind and Waves*<br>F 1270A *The Earth in Change -- The Earth's Crust*<br>FS 2318B-3 *Changing the Face of the Earth*<br>FS 2318A-6 *The Earth's Changing Crust*<br>F 1279B *Earthquakes and Volcanoes*<br>F 1271A *Wearing Away of the Land*<br>F 1274C *Geysers and Hot Springs*<br>SFS 2587E-1 *Shale, Sandstone, and Conglomerate*<br>FS 2318F-1 *How Soil is Formed*<br>SFS 2587E-2 *Coal*<br>SFS 2587E-3 *Limestone and Evaporites*<br>SFS 2587E-4 *Volcanic Rocks*<br>SFS 2587E-5 *Plutonic (Granite) Rocks*<br>SFS 2587E-6 *Metamorphic Rock*<br>SFS 2587E-7 *Recognizing Rock Making Materials*<br>SFS 2587E-8 *Comparing Rocks*<br>SFS 2587E-9 *Rocks and the Landscape* |

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| III | CHEMISTRY (pp. 115-153)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br><br>A. A molecule is the smallest particle of a substance that still has the properties of that substance.<br><br>B. Elements can be combined to build up compounds.<br><br>C. Compounds are grouped by chemical properties.<br><br>D. The presence of some substances can be determined by chemical tests.<br><br>E. The earth's matter is made up of atoms combined in many ways.<br><br>F. In ordinary chemical reactions, matter is neither gained nor lost.<br><br>G. In chemical or physical changes, the total amount of matter remains unchanged. | The student will be able to:<br><br>Demonstrates the ability of the air to hold water inside an inverted, cardboard-covered glass.<br><br>Separate the compound water into hydrogen and oxygen by electrolysis.<br><br>Identify the absence of oxygen gas by using the glowing splint test.<br><br>Test for acid and alkaline substances using red litmus paper and blue litmus paper.<br><br>Distinguish between physical and chemical changes. | USE *CHEMICAL CHANGE, Replacement Kit, Teacher's Manual, and Pupils' Recortext* WITH UNIT III.<br><br>FS 2307 *What Things Are Made Of*<br>F 1265Y *Explaining Matter: Atoms and Molecules*<br>FS 2307A *Chemical Change* (B-33 -- in school)<br>FS 2307B-1 *Atoms and Molecules* (B-42 -- in school)<br>FS 2304 *All Matter Has Three Forms*<br>F 1254E *Evidence for Molecules and Atoms*<br>F 1236 *Story of Dr. Carver*<br>TR 5977H-17 *Wizard of Diamond Grove* |
| IV | ASTRONOMY (pp. 155-199)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br><br>A. Light traveling in a straight path can be made to change direction. | The student will be able to:<br><br>Identify certain stars through use of a starfinder. | Construct a starfinder and use it to identify stars and their positions. |

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| | B. Bodies in space are in continuous change.<br><br>C. Light energy sometimes behaves as waves and sometimes as particles.<br><br>D. Distance can be measured in units of time. | Explain what happens as light passes through the lens of a telescope to the eye.<br><br>Design investigations to test how different colors reflect light. | F 1259E *Science of Light*<br>FS *Your Eyes at Work* (B-6 -- in school)<br>Demonstrate the separation of visible light into a spectrum, using a prism.<br>F 1282A *How We Explore Space*<br>F 1382C *Eyes and Vision*<br>FS 2326C *The Eyes and Seeing* |
| V | BIOLOGY OF CELLS (pp. 201-257)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br>*(HEALTH 5 -- pp. 8, 109, 112, 113)*<br><br>A. The cell is the unit of structure and function in living things.<br><br>B. Plant and animal cells have basically similar structures.<br><br>C. Cells reproduce themselves.<br><br>D. Cells are specialized for different functions.<br><br>E. A single cell may function as a complete organism or have specialized functions in many-celled organisms.<br><br>F. When a many-celled organism develops, the egg cell grows into many more cells of many different kinds. | The student will be able to:<br><br>Distinguish between living and non-living matter.<br><br>Demonstrate that a cell membrane will allow certain materials to pass through.<br><br>Construct a model of a cell.<br><br>Explain the differences between the development of frogs, robins, and mammals. | F 1379Z *About the Human Body* |

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| VI | PHYSIOLOGY (pp. 259-301)<br>*(CONCEPTS IN SCIENCE -- Purple)*<br>*(HEALTH 5 -- pp. 122-201)*<br><br>A. Animal life depends on an interchange of oxygen and carbon dioxide within the body.<br><br>B. Food substances must usually be digested before they can diffuse into cells of the body.<br><br>C. Cells are grouped into tissues that have specific functions.<br><br>D. An organism is adapted by organ systems to perform its life functions.<br><br>E. Living things are adapted by structure and function to their environment. | The student will be able to:<br><br>Measure his breathing rate by counting the number of times he inhales in one minute.<br><br>Construct a table of breathing rates of the members of his class.<br><br>Demonstrate how starch is changed into sugar. | SFS 2584A-3 *Respiratory System of the Human Body*<br>F 1379Y *Your Body and Its Parts*<br>F 1379Z *About the Human Body*<br>SFS 2584A-2 *Digestive System of the Human Body*<br>FS 2326E-5 *The Nervous System*<br>FS 2326E-6 *The Muscular System*<br>FS 2326E-7 *The Skeletal System* |
| VII | ADAPTATION TO ENVIRONMENT, PAST AND PRESENT (pp. 303-355).<br>*(CONCEPTS IN SCIENCE -- Purple)*<br><br>A. Animals of the past adapted to their environment.<br><br>B. Changes in structure enable organisms to adjust to changing environments. | The student will be able to:<br><br>Analyze fossil bones and compare them with the structure of present day animals.<br><br>Explain how a fish is adapted to life in water. | F 1270F *Fossils Are Interesting*<br>SFS 2587F-1 *How Fossils Are Formed*<br>F 1286D *The Dinosaur Age*<br>SFS 2587F-2 *Collecting and Interpreting Fossils* |

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| | C. Early animals were adapted to the seas.<br><br>D. Some sea animals changed and became adapted for land living.<br><br>E. Mammals have developed complex adaptations to the environment.<br><br>F. Over the ages living things have changed in adapting to the changing environment. | Compare the adaptations of amphibians and reptiles for land living.<br><br>Order the arrangement of the bones of the leg of a chicken when given separated chicken leg bones. | SFS 2587F-3 *Fossils and the Relative Age of Rocks*<br>SFS 2587F-4 *Fossils and Prehistoric Environments*<br>SFS 2587F-5 *Fossils and Organic Change*<br>FS 2325E-6 *The Muscular System*<br>FS 2326E-7 *The Skeletal System*<br>FS 2271A-1 *Amphibians*<br>FS 2271A-2 *Turtles*<br>FS 2271A-3 *Crocodilians and Lizards*<br>FS 2271A-4 *Snakes* |
| VIII | KEEPING SAFE (pp. 22-41)<br>*(HEALTH 5)* | The student will be able to: | |
| | A. You can live safely and prevent most accidents by knowing and using safety rules.<br><br>B. Electrical appliances must be used with great care.<br><br>C. A chemical may be helpful or harmful according to the way it is used and stored. | List at least seven examples of good health and safety precautions.<br><br>Explain the proper method of handling situations involving electricity when given a list of hazardous situations in which electricity is involved. | F 1372 *Bicycle Rules of the Road*<br>FS 2330T *Safety on the Bicycle* |

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| IX | SMOKING AND YOUR HEALTH<br>*(HEALTH 5, pp. 184-192, 195-196)*<br><br>NOTE: Although this unit appears at the end of the outline for Grade 5, it may be used at anytime during the school year. The staggered use of this unit would make it easier for teachers to secure the suggested audio-visual materials.<br><br>A. Students may acquire the habit of smoking due to the social pressure of identifying with peer groups, seeking adult status, or simply to have something to do.<br><br>1. Smoking is a habit that must be learned -- once acquired it is difficult to break.<br><br>2. Persons who were consistently more successful in breaking the habit were those persons who started smoking late in life, who have smoked the least number of years, and whose average consumption has been the smallest.<br><br>B. Tobacco smoke has an immediate effect on the normal functioning of the body. | The student will be able to:<br><br>List reasons why adults smoke.<br><br>Discuss reasons older brothers and sisters give for having started to smoke.<br><br>Describe the effects smoking has on one's personal appearance.<br><br>Explain how habits are formed.<br><br>Discuss thumb-sucking habits and methods used to break the habit.<br><br>Differentiate between habit and addiction.<br><br>Make posters and charts illustrating the reasons for not starting to smoke.<br><br>Explain the effects of smoking on physical fitness. | SFS 2584B-i *I'll Choose the High Road* (American Cancer Society)<br><br>Pamphlet -- *I'll Choose the High Road* (American Cancer Society)<br><br>Bring cigarette advertisements from newspapers. Evaluate the ideas they portray.<br><br>Use the following demonstration to show the staining effects of tobacco on fingers and teeth:<br><br>Place wet tobacco on a clean white cloth. Allow the tobacco to dry and then remove it. Observe the yellowish stain left by the tobacco.<br><br>Pamphlet -- *Where There's Smoke* (American Cancer Society) |

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| | 1. Nicotine in tobacco smoke may cause the following reactions:<br>a. Acceleration in heartbeat<br>b. Increased pulse rate and respiration rate<br>c. Constriction of blood vessels of fingers and toes causing decrease in temperature<br>d. Suppression of normal appetite<br>2. A person not accustomed to smoking may experience dizziness, nausea, and diarrhea. | Explain the effects of smoking on the digestive system. | EQUIPMENT: Plastic detergent container, or other empty plastic container, (transparent if possible), ball point pen barrel or other tubing approximately the size of a cigarette, cotton, cigarettes.<br>PROCEDURE: Rinse the container thoroughly and let dry. Make an opening in the cap of the container to fit the tubing. Place the tubing in the opening and seal tight with cement or clay if needed. Insert loosely packed cotton ball into tubing and then insert cigarette into open end of tubing. Press firmly on the plastic container to force air out before lighting the cigarette, then proceed with slow and regular pumping action. Withdraw cotton from tubing to show accumulation of tar. Pass container around for individuals to smell and to observe that smoke continued to be expelled for a period of time.<br>EXPERIMENT: Using a cotton pellet which has been saturated with tars from the smoking machine, wipe the stems of several growing plants. Keep some plants as controls to observe the differences. |
| | C. Tobacco contains substances which are harmful to the body. | Obtain and analyze the viewpoint of various physicians concerning smoking. | FS 2326E-9 *The Respiratory System*<br>F 1379Z *About the Human Body* |

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| | 1. The following substances in tobacco smoke have been shown to be capable of irritating or actually damaging tissue:<br>a. Nicotine<br>b. Tars<br>c. Carbon monoxide<br>d. Methanol<br>e. Acetone<br>f. Acids | Name health agencies which are concerned with the problems of smoking and explain their area of concern.<br>Explain the significance of the following warning which appears on every package of cigarettes: *"CAUTION: Cigarette Smoking May Be Hazardous to Your Health."*<br>Compare cigarette smoking and air pollution.<br>Discuss the "safeness" of placing filters in cigarettes. | SFS 2584D *Tobacco: Why Smoke?*<br>Pamphlet -- *What Everyone Should Know About Smoking and Heart Disease* (American Heart Association)<br>SL 2900 *Smoking and Health* (microslide unit)<br>Prepare reports on nicotine, tars, and other harmful substances found in tobacco smoke |
| | D. The problems of smoking must be evaluated by each individual when he has the facts to guide him in making an intelligent decision to follow the proper road.<br>1. Physical, mental, and social fitness are all important to understand.<br>2. At the pre-teen years it is important to understand the proper road to follow in developing fitness. | Discuss smoking as a major cause of accidental fires in the home.<br>Review city ordinances concerning smoking in public places.<br>Describe controls which might be employed by the federal government regarding the advertising and sale of tobacco products. | F 1377R *Smoking: It's Your Choice*<br>Estimate the amount of money saved in one year, if a person did not smoke two packages of cigarettes per week.<br>Find out from newspaper articles about fires caused by careless use of cigarettes.<br>Use the leaflet *"What's the Score?"* published by the Tuberculosis and Health Society as a self-testing device. |

# GRADE 6

Textbooks: Brandwein and others, *CONCEPTS IN SCIENCE -- Brown*
Byrd and others, *HEALTH 6*

Materials: Elementary Science Study, *TEACHER'S GUIDE FOR THE BEHAVIOR OF MEALWORMS*
Elementary Science Study, *ILLUSTRATIONS OF MEALWORMS*
Elementary Science Study, *TEACHER'S GUIDE FOR BATTERIES AND BULBS*
Elementary Science Study, *Student Sheets for use with BATTERIES AND BULBS*
Tannenbaum and others, *THE UNIVERSE (Original Kit, Teacher's Manual, and Pupil's Recortext)*

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| I | HOW WE LEARN (pp. 3-53) *(CONCEPTS IN SCIENCE -- Brown)*<br><br>A. Responses to stimuli may be inherited.<br><br>B. The structure of an organism fits it to interact with the environment.<br><br>C. Learning is the result of interaction of inherited structure with the environment.<br><br>D. Man -- by his structure -- adapts to and modifies his environment.<br><br>E. Man's ability to learn fits him more than any other organism, to modify his environment. | The student will be able to:<br><br>Distinguish between learned and inborn acts and between simple and complex reflexes.<br><br>Analyze a problem, demonstrate the application of variables, and order the steps of his investigational plan, and report his conclusions. | USE *TEACHER'S GUIDE FOR THE BEHAVIOR OF MEALWORMS* AND *ILLUSTRATIONS OF MEALWORMS* WITH THIS UNIT.<br><br>F 1359N *Plant Motion -- Roots, Stems, Leaves*<br><br>F 1355A *Plant Traps*<br><br>F 1382Z-7 *Your Nervous System* |

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| II | MAN AND HIS ENVIRONMENT (pp. 55-87) *(CONCEPTS IN SCIENCE -- Brown) (HEALTH 6, Chapter 5)* | The student will be able to: | |
| | A. In light, green plants produce oxygen, a gas necessary for all life. | Explain why plants need sunlight to produce oxygen. | FS 2305W-5 *The Importance of Air in Nature* |
| | B. Green plants capture the energy of sunlight to make foods and produce oxygen. | List reasons why green plants are a source of substances needed by all living things. | F 1359H *Plants Make Food*<br>FS 2249Z *Food from the Sun* |
| | C. Green plants are the source of substances needed by all living things. | Describe how the ecosystem is being destroyed and how it might be restored. | |
| | D. Plants and animals in an ecosystem depend on the radiant energy of the sun. | | |
| III | MICROORGANISMS AND DISEASE (pp. 89-137) *(CONCEPTS IN SCIENCE -- Brown) (HEALTH 6, pp. 110-165)* | The student will be able to: | |
| | A. Bacteria, like all other living things, live and grow only in an environment suited to their needs. | Demonstrate and describe the growth of bacteria in a given environment. | F 1389A-3 *Microbes and Their Control* |
| | B. Organisms are adapted to resist hostile microorganisms in their environment. | Describe how antiseptics reduce the growth of bacteria. | F 1389B *How Our Bodies Fight Disease* |
| | | List ways that man has conquered disease. | F 1389C-1 *Your Protection Against Disease* |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
|---|---|---|---|
| | C. Man changes the environment of disease organisms in seeking to conquer disease.<br><br>D. Man is part of the world ecosystem in which all living things are interdependent. | Indicate ways that man interacts with his environment. | |
| IV | A NEW VIEW OF INTERDEPENDENCES (pp. 138-145) *(CONCEPTS IN SCIENCE -- Brown)* | (Reading and Discussion Exercise) | |
| V | MACHINES (pp. 206-253) *(CONCEPTS IN SCIENCE -- Brown)*<br><br>A. Machines may multiply force, increase speed, or change direction of a force.<br><br>B. LEVERS concentrate effort, force and change its direction so that force is multiplied or speed is increased.<br><br>C. ROPE AND PULLEY SYSTEMS can both change the direction of a force and multiply it.<br><br>D. Machines are used in DIFFERENT COMBINATIONS to multiply force or speed, or change the direction of force.<br><br>E. FRICTION is a force that resists motion. | The student will be able to:<br><br>Identify the fulcrum and the long and short end of a lever in a wheel and axle.<br><br>Demonstrate the force of a lever in direct relationship to the position of the fulcrum.<br><br>Illustrate that pulleys can be used to multiply force as well as to change the direction in which it acts.<br><br>Distinguish among the effects of a fixed pulley, a movable pulley, and a block-and-tackle system.<br><br>Describe why a pulley system is convenient. | FS 2589A-2 *Work of the Lever*<br>FS 2589A-3 *Work of the Pulley*<br>FS 2589A-1 *Work of the Wheel and Axle*<br>FS 2589A-4 *Work of the Inclined Plane, Screw and Wedge*<br>FS 2589A-5 *Work of Gears*<br>F 1252H *Machines Do Work*<br>0 911 *Inclined Plane*<br>0 908 *Lever and Its Uses* |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
|---|---|---|---|
| | F. WORK is done when an object is moved through a distance.<br><br>G. Machines multiply effort or speed or CHANGE OF THE DIRECTION A FORCE acts, but the work done is not multiplied. | Describe and demonstrate friction.<br><br>Explain that work is the product of a force moving through a distance. | |
| VI | ELECTRONS AND ELECTRICITY (pp. 254-317) *(CONCEPTS IN SCIENCE -- Brown)*<br><br>A. Electrons may be transferred from one object to another by friction and by conduction.<br><br>B. A magnet and a coil of wire, in motion relative to each other, can produce a flow of electrons.<br><br>C. The energy of electrons moving through a conductor can be used to do work.<br><br>D. The energy of moving electrons can be used to produce a pattern of sound waves.<br><br>E. Electrical energy can produce radio waves that travel through space at the speed of light.<br><br>F. Energy can change in form and be transferred without change in the total amount of energy. | The student will be able to:<br><br>Demonstrate and describe the difference between current electricity and static electricity.<br><br>Illustrate how switches control the flow of electrons.<br><br>Demonstrate how to connect dry cells and wire to the electric bell.<br><br>Diagram electric circuits. Explain the arrangements of components in the circuits and predict the results in the circuit. | USE *TEACHER'S GUIDE FOR BATTERIES AND BULBS* AND *Student Sheets.* (Equipment for this unit may be ordered from warehouse.)<br><br>0 929 *Electric Bell*<br>0 931 *Telegraph*<br>SFS 2588A-1 *Light and Heat from Electricity*<br>SFS 2588A-2 *Cool Light from Electricity*<br>SFS 2588A-3 *Magnetism from Electricity*<br>SFS 2588A-4 *The Telegraph and Telephone*<br>SFS 2588A-5 *Induction and Transformers*<br>SFS 2588A-6 *Electrolysis and Electroplating*<br>FS 2305J *Electromagnets*<br>F 1253F *Electricity -- From Power Plant to Home*<br>F 1252S *Exploring Electromagnetic Energy* |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
|---|---|---|---|
| | | | F 1253E *Home Electrical Appliance*<br>F 1253R *How An Electric Motor Works*<br>F 1258M *Simple Demonstrations with Magnetism* |
| VII | THE UNIVERSE (pp. 388-421) *(CONCEPTS IN SCIENCE -- Brown)* | The student will be able to: | USE *THE UNIVERSE (Original Kit, Teacher's Manual, and Pupil's Recortext)* WITH THIS UNIT. |
| | A. The Milky Way Galaxy is vast. | Demonstrate the usefulness of estimating. | FS 2587C-4 *The Stars and Outer Space* |
| | B. Nuclear reactions are the source of a star's energy. | Explain several methods of estimating. | SFS 2587C-2 *Our Solar System*<br>F 1282A *How We Explore Space* |
| | C. The composition, temperature, and size of stars are determined by the light energy they emit. | Describe how light energy gives us information about the composition and temperature and size of stars. | F 1252D-4 *Portrait of the Sun* |
| | D. Stars are continually changing. | Draw a spectrum. | |
| | E. The position of stars changes in a predictable and orderly way. | Describe the motion of stars along a predictable path. | |
| | F. The universe is in continuous change. | | |
| VIII | NUTRITION AND DIET (pp. 78-109) *(HEALTH 6)* | The student will be able to: | |
| | A. Some foods are better for health than others. | List the food nutrients and give examples of what foods supply valuable amounts. | FS 2320B-1 *Pictures in the Sky*<br>SFS 2587C-4 *The Stars and Outer Space* |

| UNIT | CONCEPT | BEHAVIORAL OBJECTIVES | SUGGESTED TEACHING AIDS AND ACTIVITIES |
|---|---|---|---|
| | 1. Carbohydrates and fats are valuable chiefly for energy.<br>2. Proteins are valuable chiefly for body building materials.<br>B. Well-balanced diets are important to good health.<br>1. Daily food guide<br>2. Meal planning<br>3. Eating habits | Perform simple tests to identify carbohydrates, fats, proteins and starch.<br>Plan a meal menu which provides the essential food nutrients.<br>Discuss the importance of water in meal planning.<br>Discuss the effects of a poor diet on the body. | F 1420D *Foods That Build Good Health*<br>FS 2326E-14 *Diet and Health*<br>FS 2334M *Milk in Our Breakfast*<br>FS 2334K *Why Eat a Good Breakfast* |

FOR SCHOOLS WITH DEPARTMENTAL TEACHING OF SCIENCE OR A SCIENCE LABORATORY

*THE INTERACTION SCIENCE CURRICULUM PROJECT*

*GRADE 7 Interaction of Man and the Biosphere*

*GRADE 8 Interaction of Earth and Time*

A curriculum outline is not provided for the use of these textbooks for the following reasons:

1. The science committee believes that a curriculum outline might restrict some teachers in trying new and innovative investigations.

2. The *INTERACTION SERIES* is based on the inquiry method and prepares students for laboratory-oriented secondary science classes. The *Philosophy and Rationale* of the series, as set forth on page *x* in the preface to the teacher's edition, coincides with the philosophy of the science education department of the St. Louis Public Schools. We suggest that each teacher become familiar with the *Methods* (pages *xi-xii*) and, from time to time during the course of the year's work, review these ideas.

3. The teacher's edition contains a guide for every investigation suggested in the text.

FOR SCHOOLS WITH SELF-CONTAINED CLASSROOMS

*GRADE 7 Exploring Life Science*

*GRADE 8 Exploring Earth Science*

This guide is provided to help the teacher in a self-contained classroom implement the science program. It is intended to SUGGEST important concepts, not to dictate what the students must master.

The committee suggests that science is a way to involve students and teachers in a real experience that can be expanded to include other major learning areas. Many innovative teachers supplement the science program with ideas and activities that have worked for them in other classes and different situations. You are encouraged to continue these activities and to supplement the textbook with other materials that may be available through school or P.T.A. funds.

It is suggested that teachers approach the science program in a manner exploratory for both their students and themselves.

# GRADE 7

Textbook: Thurber and Kilburn, *EXPLORING LIFE SCIENCE*

Materials: Thurber and Kilburn, *EXPLORING LIFE SCIENCE, Teacher's Manual*
Thurber and Kilburn and Seager, *EXPLORING LIFE SCIENCE, Workbook*
*Science Test for EXPLORING LIFE SCIENCE*

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| INTRO. pp. 9-16 | FIELD RESEARCH | The student will be able to make a population count of dandelions for a given area using the random sampling technique. | F 1226 *Scientific Method* |
| I | PLANT AND ANIMAL COMMUNITIES (Ecology) (pp. 17-48) | The student will be able to: | |
| | A. Some relationships within the community are harmful.<br>1. Competition<br>2. Grazers and predators<br>3. Parasitism<br>a. Plants<br>b. Animals | | F 1301K *Animal Predators and The Balance of Nature*<br>FS 2250 *Let's Explore a Lawn*<br>F 1284Z-1 *Life in a Vacant Lot*<br>F 1285R *Life in the Grasslands*<br>F 1354Y *Plant Succession*<br>SFS 2585C-1 *Population Statistics* |
| | B. Most relationships within the community are beneficial.<br>1. Mutualism<br>2. Required mutualism<br>3. Lichen communities<br>4. Nitrogen fixation<br>5. Saprophytes<br>6. Scavengers | Make a chart of a community, chosen by the teacher, to show how the members of that community are dependent upon one another. | SFS 2585C-2 *Population Trends*<br>SFS 2585C-3 *Some Ecological Considerations*<br>SFS 2585C-4 *Evolution and Extinction* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | C. Biologists analyze a community by identifying, counting, and measuring the organisms.<br>1. Quadrat sampling<br>2. Quadrat analysis<br>3. Sectioning | Write a paragraph comparing the uses of quadrat sampling with those of strip sampling. | |
| | D. Communities are in constant change, through succession.<br>1. Fallow field succession<br>2. Bare rock succession<br>3. Forest succession<br>4. Pond succession | | |
| II | MAN AND HIS ENVIRONMENT<br>(Human Ecology) (pp. 49-80) | The student will be able to: | |
| | A. Man influences his environment.<br>1. Landscape<br>2. Population<br>3. Water | Give examples of the effect that increased population in the United States will have on water supply and the disposal of waste.<br><br>Make a list of possible side effects of insect spraying. | FS 2260T-5 *Introduction to Ecology*<br>F 1284Y *What is Ecology*<br>F 1340Y *Man and His Natural Environment -- The Creek*<br>SFS 2585C-5 *Pesticides*<br>SFS 2585C-6 *Pollution*<br>F 1388Q *Our Land Needs Your Help* |
| | B. Man influences nature.<br>1. Interdependence<br>2. Natural controls<br>3. Predators | | |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | C. Man uses and misuses his resources.<br>1. Use of resources<br>2. Misuse of resources<br>3. Conservation of resources | | |
| III | INSECTS AND THEIR BEHAVIOR (pp. 81-112) | The student will be able to: | |
| | A. All insects are alike in certain basic ways.<br>B. Insects develop through a series of steps or stages.<br>C. Environmental conditions often affect the behavior of insects.<br>1. Color of light<br>2. Direction of light | Identify the nine major parts of an insect.<br>Group successfully a selection of insects given to him by the teacher.<br>Make a collection of insects found in his community. | FS 2264C-1 *What Is An Insect?*<br>F 1354A *Introducing Insects: Butterflies, Beetles and Bugs*<br>F 1345C *Insect Anatomy*<br>FS 2264C-3 *The Life Cycles of Insects*<br>F 1350X *Insect Zoo*<br>FS 2264C-2 *Insects That Live in Societies*<br>FS 2264C-4 *Insects Harmful and Useful* |
| IV | SEASONAL BEHAVIOR (pp. 113-144) | The student will be able to: | |
| | A. Seasonal changes produce an automatic behavioral response in most organisms.<br>B. Seasonal changes cause variations in the climate. | List five observations he has made of seasonal changes in plants and animals studied in this unit. | FS 2260T-2 *Adaption to Environment*<br>F 1301D *Animals in Winter*<br>F 1332A *Bird Migration* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | C. Temperature changes produce behavioral responses in most animals.<br><br>D. Plants respond to temperature change.<br>1. Become dormant<br>2. Die<br>3. Develop hardiness | Perform a controlled experiment testing some behavioral response of an insect. He will state the purpose and expected results of the experiment. | |
| | E. Many plants and animals are affected by the length of day and night.<br>1. Short and long day plants<br>2. Bird migration<br>3. Change of coat<br>4. Molting<br>5. Hibernation<br>6. Food storage | Describe the changes hibernating animals undergo as winter comes. | |
| V | MICROORGANISMS (pp. 145-176)<br>*(HEALTH 7 -- pp. 218-241)* | The student will be able to: | |
| | A. Microorganisms live almost everywhere on earth.<br>1. Microscopic in size<br>2. Variety of species | Prepare a live culture. | FS 2250N-2 *Let's Explore a Pond*<br>FS 2247A *Life in Ponds, Lakes, and Streams* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | B. Ponds support vast amounts of microscopic life. | | |
| | 1. Plants | | |
| | 2. Animals | | |
| | 3. Food chains | List the stages in a food chain. | |
| | C. Fungi are nongreen plants | Explain the process of fermentation and list its products and uses. | |
| | 1. Yeast | | |
| | 2. Molds | Describe an experiment to show the food preferences of molds. | |
| | 3. Bacteria | | |
| VI | CHEMISTRY OF COMMON FOODS (pp. 177-208) *(HEALTH 7 -- pp. 198-217)* | The student will be able to: | |
| | A. Foods provide chemical energy upon which life depends. | | |
| | B. There are seven chemical classes of food. | Give examples of each of the seven classes of food. | |
| | 1. Proteins | Perform three tests for food classification. | |
| | 2. Fats and oils | | |
| | 3. Sugars | | |
| | 4. Starches | | |
| | 5. Minerals | | |
| | 6. Vitamins | | |
| | 7. Water | | |
| | C. Food energy is measured in calories. | | |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| VII | SUPPLYING OUR CELLS (pp. 209-240)<br>*(HEALTH 7 -- pp. 50-69)*<br><br>A. Our bodies are made up of highly specialized cells.<br>1. General chemical composition<br>2. Structure and composition of tissues<br><br>B. The digestive process prepares food for the cells.<br><br>C. Metabolism within the cells releases the energy of food nutrients. | The student will be able to:<br><br>Draw a picture of a bone and label its parts.<br><br>Identify the parts of the digestive system.<br><br>Name and describe the parts of a cell and the function of each part.<br><br>Identify the various factors that affect the digestion of starch by saliva. | F 1379Z *About the Human Body*<br>F 1383P *Exploring Your Growth*<br>SFS 2584A-2 *Digestive System of the Human Body* |
| VIII | RESPIRATION (pp. 241-272)<br>*(HEALTH 7 -- pp. 118-137)*<br><br>A. All organisms require energy to carry on the processes of living.<br><br>B. The oxidation of food provides energy<br><br>C. Respiration is the exchange of gases within an organism.<br><br>D. Breathing is the first stage of respiration.<br><br>E. Blood transports vital gases between lung and body cells. | The student will be able to:<br><br>Demonstrate the presence of carbon dioxide in exhaled air.<br><br>Describe how the change in air pressure is brought about in the lungs during the breathing process.<br><br>Identify from a drawing the parts of the circulatory system.<br><br>Draw a diagram of the heart and label its parts. | SFS 2584A-3 *Respiration System of the Human Body*<br>FS 2326E-9 *The Respiration System*<br>FS 2326E-8 *The Circulatory System*<br>F 1383B-4 *Circulation -- Why and How*<br>F 1383F-6 *Circulation*<br>F 1256H *How Does a Candle Burn?* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| IX | HOW LIFE CONTINUES (pp. 273-304) | The student will be able to: | |
| | A. All organisms reproduce themselves. | Order the stages of cell division (selected at random). | F 1388F-1 *The Miracle of Reproduction* |
| | B. Sexual reproduction takes place from the cells of a single parent. | Describe the fertilization process of flowering plants. | SFS 2585A *Flowers -- Their Parts and Functions* |
| | C. Sexual reproduction takes place from the cells of two parents.<br>1. Conjugation<br>2. Pollination<br>3. Fertilization | Draw a chart showing the life cycle of a plant that involves alternation of generations. | F 1356 *Flowers at Work* |
| X | OUR SENSES (pp. 305-336)<br>*(HEALTH 7 -- pp. 138-157)* | The student will be able to: | |
| | A. We depend more upon vision than upon all our other senses.<br>1. Parts of the eye<br>2. Focusing the eye<br>3. Faulty vision<br>4. Visual effects | Label the basic parts of the eye.<br>Demonstrate and explain blended images. | F 1382C *Eyes and Vision*<br>F 1382A-1 *You and Your Eyes*<br>F 1381C *The Ears and Hearing* |
| | B. The sense of hearing is probably our most active sense.<br>1. Structure of ear<br>2. Audio functions of the ear | Describe the functions of the parts of the middle ear.<br>Explain the importance of binaural hearing. | |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | C. Certain nerve endings in our bodies are sensitive to chemicals.<br>1. The tongue<br>2. The nose<br>D. The body has additional senses.<br>1. Balance<br>2. Touch | Describe an experiment for mapping the taste areas of the tongue.<br>Name each of the five senses and describe the function of each related organ. | |
| XI | MECHANISM OF BEHAVIOR (pp. 337-368)<br>*(HEALTH 7 -- pp. 70-93)*<br>A. The behavior of an organism can be traced to some condition affecting the organism.<br>1. Stimulus<br>2. Response<br>B. The nervous system controls behavior.<br>C. The body has a central nervous system and an autonomic nervous system.<br>1. The spinal cord; structure and function<br>2. The brain; structure and function | The student will be able to:<br>Demonstrate through the use of a controlled experiment some behavior response observed with mealworms.<br>Make a diagram of the structure of a nerve cell.<br>Describe the function of the central nervous system.<br>Describe the function of the autonomic nervous system. | F 1377V *Your Amazing Mind*<br>F 1382Z-7 *Your Nervous System* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | D. The body has a chemical control system.<br><br>E. There are several types of behavioral responses.<br>1. Conditional reflexes<br>2. Reward and punishment<br>3. Trial-and-error learning<br>4. Habit formation<br>5. Problem solving | Name and describe the function of the three major hormone producing glands in the human body.<br><br>Compare conscious behavior with instinct.<br><br>Design an experiment that demonstrates trial-and-error learning. | |
| XII | THE GROWTH OF PLANTS (pp. 369-400)<br><br>A. Seeds develop into fully active plants.<br>1. Parts of seeds<br>2. Germination<br>3. Respiration of seeds<br>4. Structure of seedlings<br><br>B. Plants have other methods of reproducing.<br>1. Cuttings<br>2. Grafts<br>3. Runners<br>4. Tip rooting<br>5. Bulbs<br>6. Corms | The student will be able to:<br><br>Demonstrate the need of oxygen during seed germination.<br><br>Describe how roots and stems are affected by position of seeds.<br><br>Grow a young plant from a parent plant using some method other than seeds.<br><br>List five methods for reproducing plants.<br><br>Describe the procedure and results of a simple experiment demonstrating the effects of light on bean seedlings.<br><br>Explain the cause of twining. | FS 2250P-4 *Flowers, Fruits, and Seeds*<br>FS 2252P *How New Plants Are Produced (Part B)*<br>FS 2250P-5 *Growth from Seeds*<br>F 1359N *Plant Motions -- Roots, Stems, Leaves*<br>F 1285A-3 *The Changing Forest -- A First Film*<br>FS 2252Q *How Plants Spread and Reproduce*<br>F 1299D *The Terrarium* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | 7. Underground stems<br>8. Division<br>9. Tubers<br>C. Young plants exhibit various behaviors.<br>1. Regions of governing growth<br>2. Response to gravity<br>3. Response to light<br>4. Response to pruning<br>5. Twining | | |
| XIII | HOW GREEN PLANTS MAKE FOOD (pp. 401-432)<br>A. Plants have a cellular structure.<br>1. Types<br>2. Organization<br>B. A model cell aids in understanding cell processes.<br>1. Making a model<br>2. Osmosis<br>3. Digestion in cell<br>C. Plants have special tissues for circulation of food and water.<br>1. Root pressure | The student will be able to:<br>Identify the parts of a plant cell.<br>Construct a model cell.<br>Demonstrate and explain osmosis.<br>Describe digestion in plant cells.<br>Demonstrate capillary action.<br>Compare and describe the types of stems.<br>Describe the functions of the stomates and guardcells. | F 1359H *Plants Make Food*<br>F 1359G *Gift of Green*<br>FS 2250P-1 *Roots and Their Work*<br>FS 2250P-2 *Stems and Their Work*<br>FS 2250P-3 *Leaves and Their Work* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | 2. Capillary action<br>3. Conducting tissues<br>D. Leaves are the food-making organs of green plants.<br>1. Structure<br>2. Function<br>E. Photosynthesis is the food-manufacturing process in plants.<br>1. Effect of sunlight<br>2. Role of chlorophyll<br>3. Carbon dioxide<br>4. By-products | Explain the importance of leaf surfaces to transpiration.<br>Demonstrate a test for starch in plant leaves.<br>Explain the transport system in plants. | |
| XIV | GROUPING PLANTS AND ANIMALS (pp. 433-464)<br>A. No two organisms are exactly alike.<br>B. Organisms that are related then have similar structures.<br>C. Biologists have a system of classification based on similarities of structure.<br>D. Species can change from generation to generation. | The student will be able to:<br>Describe how the relationship between groups of animals can be shown by skeletal structure.<br>Classify an organism into kingdom, phylum, and class.<br>Describe the development of animals through natural selection. | TR 6508 *Classification* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| XV | TOBACCO, ALCOHOL, AND DRUGS<br>(pp. 465-480)<br>*(HEALTH 7 -- pp. 83-86)*<br><br>A. The tobacco habit is widespread.<br>1. Nature of tobacco smoke<br>2. Disease related to smoking<br><br>B. There are serious risks in the use of alcoholic beverages.<br>1. Alcohol groups<br>2. The body's reaction to alcohol<br>3. Blood -- alcohol and driving laws<br><br>C. The abuse of drugs takes many forms.<br>1. Classifying drugs<br>2. Medical use of drugs<br>3. Drug abuse | The student will be able to:<br><br>Identify the substances in tobacco smoke.<br><br>List some diseases which appear to be directly related to smoking.<br><br>List the four types of alcohol and discuss their uses.<br><br>Describe some behavioral affect that alcohol has on the body.<br><br>Describe beneficial uses of drugs.<br><br>Discuss probable causes of drug dependency.<br><br>List legal, social, economic, and physiological problems related to drug abuse. | SL 2900 *Smoking and Health*<br>F 1377 *Weed*<br>F 1377S *Marijuana*<br>F 1377P *Narcotics -- Pit of Despair*<br>F 1377W-2 *Drugs and the Nervous System* |

## GRADE 8

Textbook: Thurber and Kilburn, *EXPLORING EARTH SCIENCE*

Materials: Thurber and Kilburn, *EXPLORING EARTH SCIENCE, Teacher's Manual*
Thurber and Kilburn, *EXPLORING EARTH SCIENCE, Workbook*
*Science Test for EXPLORING EARTH SCIENCE*

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| INTRO. | Scientific information is obtained in a specific manner. The process of scientific investigation includes hypothesis, experimentation, and theory. | The student demonstrates the scientific process by carrying out an investigation. | |
| I | MINERALS AND THEIR USES (pp. 17-48) | The student will be able to: | |
| | A. The solid part of the earth is made up of rocks. | Use tests such as streak, hardness, and cleavage to identify rocks and minerals. | 0 577 *Missouri Minerals* |
| | B. Rocks are made up of minerals. | Identify ten different minerals. | |
| | C. Minerals are composed of chemical elements. | | |
| | D. Minerals are identified by their physical and chemical properties. | | |
| II | ROCKS AND THEIR CHANGES (pp. 49-80) | The student will be able to: | |
| | A. Sediments which have hardened into a solid mass are called sedimentary rocks. | Identify the three classifications of rocks. | F 1270M *Minerals and Rocks -- Stone of the Earth*<br>FS 2318C *How Rocks are Formed*<br>F 1270H *Rocks that Reveal the Past* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | B. Rocks that form when molten rock materials cool are classed as igneous rocks.<br><br>C. Rocks that are changed by heat and pressure are called metamorphic rocks. | Describe how the changes in rocks occur. | SFS 2587E-1 *Shale, Sandstone, and Conglomerate*<br>SFS 2587E-2 *Coal*<br>SFS 2587E-3 *Limestone and Evaporites*<br>SFS 2587E-4 *Volcanic Rocks*<br>SFS 2587E-5 *Plutonic (Granitic) Rocks*<br>SFS 2587E-6 *Metamorphic Rocks*<br>SFS 2587E-7 *Recognizing Rock Making Materials*<br>SFS 2587E-8 *Comparing Rocks*<br>SFS 2587E-9 *Rocks and the Landscape* |
| III | EROSION AND ITS EFFECTS (pp. 81-113) (pp. 81-113) | The student will be able to: | |
| | A. The rocks of the earth are under constant attack by the elements of erosion.<br><br>B. The processes of erosion are generally very slow. | Define erosion by various elements *i.e.*, water, wind, weathering.<br><br>Identify types of erosion by the effect on the shapes of rocks. | F 1271A *A Wearing Away of the Land* |
| IV | THE NATURE OF SOIL (pp. 113-144) | The student will be able to: | |
| | A. Soil is composed of many things.<br><br>B. Soil is changing constantly. | Construct a sample soil profile.<br><br>Illustrate methods of soil testing. | F 1270P *Rocks that Form on the Earth's Surface*<br>FS 2318F-1 *How Soil is Formed* |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
|---|---|---|---|
| | C. Chemicals in the soil are necessary for life. | Describe the variety of life in soil. | |
| | D. Soil contains many small organisms. | | |
| V | LIFE IN THE PAST (pp. 145-176) | The student will be able to: | |
| | A. Fossils are evidences of extinct life. | Distinguish between plant and animal fossils. | F 1270F *Fossils Are Interesting* |
| | B. Fossils are formed in a variety of ways. | Construct a fossil of plaster of paris. | SFS 2587F-1 *How Fossils Are Formed*<br>SFS 2587F-2 *Collecting and Interpreting Fossils* |
| | C. Fossils help us make inferences about extinct organisms. | Identify common St. Louis area fossils such as crinoids, brachiopods, and trilobites. | SFS 2587F-3 *Fossils and the Relative Ages of Rocks*<br>SFS 2587F-4 *Fossils and Prehistoric Environments*<br>SFS 2587F-5 *Fossils and Organic Change* |
| VI | RECORD OF THE ROCKS (pp. 177-207) | The student will be able to: | |
| | A. Sedimentary rock provides us with most of our knowledge about the geologic past. | | F 1270A *Earth in Change -- The Earth's Crust* |
| | B. Geologic time is divided into eras. | Describe the geological time periods for North America. | F 1279B *Earthquakes and Volcanoes*<br>F 1114M *Pompeii and Vesuvius* |
| | C. There are many evidences of rock movements. | Describe six types of rock movement. | F 1274C *Geysers and Hot Springs* |
| | 1. Metamorphism | | FS 2318B-7 *Volcanoes and Earthquakes* |
| | 2. Synclines and Anticlines | Construct, from clay, a folding movement of rocks. | |

| UNIT | OUTLINE | BEHAVIORAL OBJECTIVES | SUPPLEMENTARY MATERIAL |
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| | 3. Geosyncline<br>4. Faults<br>5. Earthquakes | | F 1275G *Great Lakes -- How They Were Formed*<br>F 1273A *Glaciers* |
| | D. A volcano is an opening in the earth's crust from which molten rocks and gasses are forced. | List the major areas of volcanic activity in North and South America. | SFS 2587D-1 *Investigating a Glacier*<br>SFS 2587D-2 *How A Glacier Shapes Its Valley* |
| | E. Glaciers are slow moving streams of ice.<br>1. Cirques<br>2. Troughs<br>3. Drumlins<br>4. Moraines | Give examples of the types of glaciers and their movements. | SFS 2587D-3 *Reconstructing the Ice Age*<br>SFS 2587D-4 *Some Side Effects of the Ice Age* |
| VII | TOPOGRAPHIC MAPS (pp. 209-240) | The student will be able to: | |
| | A. Map making requires knowledge of:<br>1. Contour lines<br>2. Contour intervals | Construct a map of the school yard.<br>Construct a graph showing elevation and distance in miles using contour lines and intervals. | FS 2317F-1 *Maps -- What They Are*<br>FS 2317F-4 *Maps -- Their Types and Use*<br>FS 2317F-2 *Map Symbols and Terms* |
| | B. Streams cause many changes to the contour of the earth.<br>1. Stream profile<br>2. Meandering stream<br>3. Deltas<br>4. Alluvial fans and cones | Describe a stream profile, deltas, alluvial fans and cones. | FS 2318B-8 *Mountains* |

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|---|---|---|---|
| | C. Glaciers have changed the surface of the earth.<br>1. Glaciated valleys<br>2. Continental glaciers | Explain the developmental process of a U-shaped valley. | |
| | D. Mountain characteristics are easily seen on topographic maps. | Describe the formation of mountains by volcanic activity. | |
| VIII | THE ATMOSPHERE (pp. 241-272)<br>*(HEALTH 8 -- pp. 154-173)* | The student will be able to: | |
| | A. Our atmosphere is a mixture of gases. | Name and describe major gases in the atmosphere. | FS 2305W-3 *Airworks for Man*<br>FS 2305W-4 *Composition of the Air*<br>FS 2305W-6 *Earth's Atmosphere*<br>F 1235F *Water -- Coming and Going*<br>F 1276A *Water Cycle* |
| | B. The atmosphere contains an astonishing amount of dust.<br>1. Types<br>2. Sources | | |
| | C. The atmosphere also contains water vapor.<br>1. Evaporation<br>2. Saturation and temperature<br>3. Relative humidity<br>4. Dew point<br>5. Frost<br>6. Fogs | Demonstrate that water is in the atmosphere by testing for condensation.<br>Determine conditions necessary for a rainbow in the atmosphere. | |
| | D. Air has weight and exerts a pressure. | Demonstrate how atmospheric pressure is measured by constructing a barometer. | |

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| | E. The atmosphere has distinctive layers, each having special characteristics.<br>1. Troposphere<br>2. Stratosphere<br>3. Ionosphere | Define the three layers of the atmosphere and give reasons for temperature change as altitude increases. | |
| IX | WEATHER AND ITS CAUSES (pp. 273-304) | The student will be able to: | |
| | A. Energy causes movements in the atmosphere.<br>1. Radiant energy<br>2. Heat energy | Describe the effects of radiant and heat energy upon weather factors, such as movement of air masses. | F 1245C *Origins of Weather*<br>F 1116D *Wind from the West*<br>FS 2318B-6 *Wind and Waves* |
| | B. Winds are caused by the unequal heating of the atmosphere. | Illustrate convection currents in water.<br>Contrast three types of storms. | F 1245D *Be Your Own Weather Man* |
| | C. Air masses influence weather conditions. | Draw the wind belts over the surface of the earth. | |
| | D. Forecasting weather requires knowledge of atmospheric conditions and changes. | Forecast weather conditions by using weather maps from the daily newspaper. | |
| X | CLIMATES AND MICROCLIMATES (pp. 305-336) | The student will be able to: | |
| | A. Solar radiation affects the climate.<br>1. Absorption<br>2. Reflection<br>3. Conduction | Describe changes in temperature of water due to seasonal change. | FS 2305W-6 *Earth's Atmosphere*<br>F 1235F *Water -- Coming and Going*<br>F 1256C *Learning About Heat*<br>F 1252D-3 *Sun's Energy* |

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| | B. The climate of the soil is of great importance to many living things.<br>1. Evaporation<br>2. Radiation<br>3. Heat conduction | Compare radiant heat absorption and radiation of terrestial materials (*i.e.*, sand, grass, water, soil). | |
| | C. Water habitats have microclimates.<br>1. Heat absorption<br>2. Conduction<br>3. Volume changes<br>4. Density changes | | |
| | D. Microclimates in air are apt to be much more changeable than those in soil or water. | | |
| | E. Geographers class the variety of climates on the earth into major world climate zones.<br>1. Latitude and altitude<br>2. Equator<br>3. Pressure belts<br>4. Mountain ranges | List world climates due to geographic locations. | |
| | F. Cities change the local climate conditions.<br>1. Solar energy<br>2. Heat from fuels<br>3. Dust domes<br>4. Fogs and smog | Indicate factors contributing to weather conditions in urban areas. | |

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| XI | WATCHING THE SKY (pp. 337-368) | The student will be able to: | |
| | A. Techniques have been developed to locate celestial objects.<br>1. Horizon and true horizon<br>2. Angle of elevation<br>3. North Star<br>4. Vertical and horizontal | Demonstrate the procedure for locating celestial objects. | FS 2587C-4 *Stars and Outer Space* |
| | B. A sky model aids in understanding celestial motions.<br>1. Rotation<br>2. Sky pole<br>3. Sky equator | Construct a model of a sky globe. | |
| | C. The sun has several apparent motions.<br>1. Path of the sun<br>2. Elevation<br>3. Seasonal changes<br>4. Effect of latitude | | |
| | D. The sun and its planets make up our solar system.<br>1. Distance in system<br>2. Ecliptic<br>3. Morning and evening star | Construct a model of the solar system which suggests the relationships of the planets. | |
| | E. The moon has several motions.<br>1. Daily and monthly changes<br>2. Reflection of moon | Illustrate and explain the various phases of the moon. | |

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| XII | THE EARTH IN SPACE (pp. 369-400) | The student will be able to: | |
| | A. The laws of motion<br>1. Newton<br>2. Inertia<br>3. Force (gravity)<br>4. Mass | Describe the laws of motion and relationship to time. | F 1244X *Force of Gravity*<br>F 1244X-1 *Gravity, Weight and Weightlessness*<br>F 1066K-1 *Time Direction*<br>F 1262A *Time* |
| | B. Position and time are reference points on the earth's surface.<br>1. Longitude<br>2. Latitude<br>3. Time zones (United States and World)<br>4. International Date Line | | F 1066M *Latitude and Longitude* |
| | C. Much information about the earth's interior is gained from earthquake energy waves.<br>1. Seismograph<br>2. Seismograms<br>3. Regions of the earth's interior<br>4. Theory -- Earth's interior | Define three types of earthquakes. | |
| | D. The earth behaves like a giant magnet.<br>1. Magnetic field<br>2. Magnetic poles<br>3. Effects upon magnetic fields | Indicate the magnetic poles and magnetic fields of the earth on a globe. | |

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|---|---|---|---|
| | E. Scientists have long been gathering evidence of the earth's shape and motion.<br>1. Earth's shadow<br>2. Pendulum<br>3. Parallax<br>4. Four seasons<br>5. Gyroscopes | Illustrate with globe and light source the earth's motions and seasons. | |
| XIII | OBJECTS IN ORBIT (pp. 401-432) | The student will be able to: | |
| | A. The planets have elliptical orbits.<br>1. The earth's orbit<br>2. Orbits of the planets<br>3. Comets<br>4. Eclipses | Draw elliptical and eccentric orbits.<br>Construct a model of solar and lunar eclipses. | FS 2320C-1 *Sun and Its Family*<br>FS 2320A-2 *You and the Universe*<br>F 1282C *Planets in Orbit*<br>F 1281K *What is an Eclipse?*<br>F 1252D-4 *Portrait of the Sun* |
| | B. Man's knowledge has developed enough so that he is able to launch man-made objects into orbit.<br>1. Rocketry<br>2. Space research | Define the concepts of force, mass, and velocity. | F 1282A *How We Explore Space* |
| XIV | THE OCEAN (pp. 433-468)<br>*(HEALTH 8 -- pp. 174-193)* | The student will be able to: | |
| | A. About 70% of the earth's surface lies below sea level.<br>1. Continental masses | Describe the ocean floor. | FS 2318T *The Ocean*<br>FS 2585R-1 *Study of Oceans* |

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| | 2. Underwater topography<br>3. Marine sediments | Explain the composition of sea water. | F 1272R *Oceanography -- Science of the Sea*<br>F 1272Q *What's Under the Ocean?* |
| | B. Sea water has special characteristics.<br>1. Composition<br>2. Pressures<br>3. Icebergs | | F 1272P *Science of the Sea* |
| | C. Waves are the most conspicuous feature of the open ocean.<br>1. Origin<br>2. Wave action | | |
| | D. Ocean waters have tide and current movements.<br>1. Currents<br>2. Ocean currents and climate<br>3. Tides | | |
| | E. The oceans have an abundance of marine organisms.<br>1. Phytoplankton<br>2. Zooplankton<br>3. Energy chain | Indicate the difference between phytoplankton and zooplankton. | |
| | F. Oceans possess enormous resources.<br>1. Minerals<br>2. Food<br>3. Conservation | Describe the ocean as a source of food for man. | |

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| XV | YOUR PERSONALITY AND YOUR FAMILY<br>*(HEALTH 8 -- pp. 10-23)* | The student will be able to: | |
| | A. People can improve their personality traits.<br>B. Mental health concerns feelings, attitudes, and abilities.<br>C. Having self-confidence, making adjustments, controlling emotions, and understanding feelings of rebellion, are signs of good mental health.<br>D. Family conflicts are most likely to occur in four areas:<br>1. Spending money<br>2. Outside activities and social life<br>3. Time spent doing school work<br>4. Clothes<br>E. There are some basic steps which can help improve relationships within the family. | List desirable personality traits.<br>Define personality.<br>Discuss concrete suggestions for improving understanding of the members of the family group. | F 1453A *When I'm Old Enough -- Goodbye*<br>F 1456J *Roots of Happiness*<br>F 1455G *By Jupiter*<br>F 1456M *Parents Are People, Too*<br>FS 2564C *Values for Teenagers -- The Choice is Yours, Part 1, Confusions*<br>FS 2564C *Values for Teenagers -- The Choice is Yours, Part 2, Decisions* |
| XVI | SAFETY AND FIRST AID<br>*(HEALTH 8 -- pp. 30-53)* | The student will be able to: | |
| | A. Certain principles underlie all first aid treatments. | List the six general principles of first aid. | F 1378H *First Aid Now*<br>F 1408E *Rescue Breathing* |

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| | B. There are specific methods of first aid treatment for bleeding, asphyxiation, poisoning, shock and burns, fainting, sprains and strains, and broken bones.<br><br>C. First aid kits may be necessary for treatment of injuries. | Demonstrate basic first aid treatment methods as directed by the teacher.<br><br>List the contents of a useable first-aid kit. | |

Teachers may wish to include other health units that are appropriate to the learning activities of their class. Suggested units in the *HEALTH 8* text are:

Unit 4 -- HEALTH DURING YEARS OF GROWTH

Unit 6 -- PROGRESS IN FOOD SCIENCE

Unit 7 -- TOBACCO AND NARCOTIC SUBSTANCES

Unit 10 -- YOUR COMMUNITY AND YOUR HEALTH